Change in Nutrition and Food Security in Two Inuit Communities

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Change in Nutrition and Food Security in Two Inuit Communities, 1992 to 1997

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Table of Contents

BACKGROUND 1

OBJECTIVES 4

STUDY DESIGN AND METHODOLOGY 5
- Community Selection and Timing of the Surveys 5
- Study Population 5
- Consultations 7
- Assessment Tools 7
  - Nutrition survey questionnaire 7
- Training 8
- Administration of the Questionnaire 8

DATA ANALYSIS 9

METHODOLOGICAL CONSIDERATIONS 11

RESULTS 14
- Community Profiles 14
- Socio-demographic Information 14
  - Age and marital status 14
  - Education 14
  - Employment, income and household composition 16
- General Health and Lifestyle 18
  - Personal assessment of health 18
  - Medical conditions, pregnancy and lactation 19
  - Body Mass Index (BMI) 20
  - Number of births and birthweight 21
  - Smoking 22
  - Activity level 24
  - Social issues of concern 25
- Food Security 26
  - Perceptions about food security 26
  - Changes in food affordability in the past five years 28
  - Food insufficiency and food insecurity 29
  - Access to country food 31
  - Nutrition training 32
- Food Consumption Patterns 32
  - Country Food 32
  - Dairy Products 37
  - Store Meat, Poultry, Fish, Eggs and Alternates 38
  - Cereal Products 41

Fruit and Vegetables 42
Fats and Oils 45
Sugar and Sweets 45
Miscellaneous Foods 46
Foods of Little Nutritional Value 46
Perceived changes in food consumption 48
Energy Intake 50
Macronutrient Intake 53
Protein 53
Fat 53
Carbohydrate 54
Sources of energy 54
Micronutrient Intake 56
Vitamin A 57
Vitamin C 59
Folate 59
Thiamin, riboflavin, niacin, vitamin B_6 and vitamin B_{12} 62
Calcium 62
Iron and zinc 65
Caffeine and cholesterol 67
Matched Analysis 67
Energy and Nutrient Contribution by Food Mail Category 68
Country Food 68
Nutritious Perishable Foods 73
Non-perishable Foods 77
Foods of Little Nutritional Value 80
Convenience Perishables 83
Sources of Energy and Nutrients by Food Group 84
Energy 84
Fat and saturated fat 86
Vitamin A 87
Vitamin C 88
Folate 88
Calcium 90
Iron 91

DISCUSSION AND CONCLUSIONS 93
Impact of the Food Mail Program on Food Security 93
Health and Nutrition Concerns 93
Changes in Food Consumption since 1992 95
Factors Affecting Food Choices 98
Ways of Improving the Effectiveness of the Food Mail Program 100
Lessons Learned 101
Suggestions for Further Analysis and Action 103

REFERENCES 105

APPENDIX A Northern Air Stage Program: Eligible and ineligible products, May 1996

APPENDIX B Classification of foods reported in the 24-hour recall according to food groups and Food Mail categories

APPENDIX C Energy and nutrient intakes by Food Mail category

List of Tables

Table 1	Weekly cost of a northern nutritious food basket for a family of four, 1991 to 1997	2
Table 2	Percent of after-shelter social assistance income required to purchase the Northern Food Basket for a family of four, 1991 to 1997	3
Table 3	Weekly cost of perishable fruits and vegetables for a family of four, 1992 and 1997	3
Table 4	Kilograms of Nutritious Perishable Food shipped per capita	3
Table 5	Respondent age, marital status and education	15
Table 6	Employment and household income, 1997	17
Table 7	Distribution of women by socio-economic group, 1997	18
Table 8	Household composition and number of persons usually eating in the home	18
Table 9	Personal assessment of health	19
Table 10	Women reporting medical conditions, pregnancy and lactation	20
Table 11	Body Mass Index (BMI)	21
Table 12	Smoking	23
Table 13	Self-reported activity level	24
Table 14	Percent of respondents "not concerned" about specific social issues	25
Table 15	Percent of respondents "extremely concerned" about specific social issues	25
Table 16	Perceptions about food security in the community	27
Table 17	Ability to feed family compared to five years ago	28
Table 18	Reported food insufficiency and food insecurity	29

102-01268/

Table 19	Count of women in households reporting "not enough to eat in the house last month" by socio-economic group	30
Table 20	Count of women in households reporting "running out of money to buy food" (for Repulse Bay and Pond Inlet combined) by socio-economic group	30
Table 21	Ways of dealing with problem of running out of money to buy food	31
Table 22	Reported access to country food	31
Table 23	Mean daily consumption (grams) of country food: 24-hour recall	33
Table 24	Average weekly consumption (grams) of selected country foods: food frequency questionnaire	34
Table 25	Perceived changes in country food consumption over the past five years, Repulse Bay, 1997	36
Table 26	Perceived changes in country food consumption over the past five years, Pond Inlet, 1997	37
Table 27	Mean daily amount (grams) of major Dairy Products consumed: 24-hour recall	38
Table 28	Mean daily amounts (grams) of major store Meat, Poultry, Fish, Eggs and Alternates consumed: 24-hour recall	39
Table 29	Average weekly amounts (grams) of store Meat, Poultry and Fish consumed: food frequency questionnaire	40
Table 30	Mean daily amount (grams) of major Cereal Products consumed: 24-hour recall	41
Table 31	Mean daily amounts (grams) of Fruit and Vegetables consumed: 24-hour recall	43
Table 32	Percent reporting consumption of selected fruits and vegetables in past month: food frequency questionnaire	44
Table 33	Perception of changes in quality and variety of fruits and vegetables over the past five years	45

Table 34	Mean daily consumption of potato chips and pop	47
Table 35	Perceived changes in store food consumption over the past five years, Repulse Bay, 1997	49
Table 36	Perceived changes in store food consumption over the past five years, Pond Inlet, 1997	49
Table 37	Perception of major changes in food consumption over the past five years	50
Table 38	Mean energy and macronutrient intake of all women aged 15 to 44	51
Table 39	Mean energy and macronutrient intake of pregnant and lactating women aged 15 to 44	52
Table 40	Percent of energy from macronutrients for all women aged 15 to 44	55
Table 41	Mean vitamin intake of all women aged 15 to 44	56
Table 42	Mean vitamin intake of pregnant and lactating women aged 15 to 44	57
Table 43	Mean intake of selected micronutrients, all women aged 15 to 44	64
Table 44	Mean intake of selected micronutrients, pregnant and lactating women aged 15 to 44	65
Table 45	Mean iron intake (mg) by age group, 1997	67
Table 46	Mean daily amount of energy and selected nutrients obtained from country food: 24-hour recall	69
Table 47	Mean daily amount of energy (Calories) obtained from country food by age group, 1997	69
Table 48	Contribution of country foods to mean iron intake, Repulse Bay	72
Table 49	Weight of Nutritious Perishable Foods consumed by food group, 1997	73
Table 50	Mean daily amount of energy and selected nutrients obtained from Nutritious Perishable Food	74

Table 51	Mean daily amount of energy and selected nutrients obtained from Non-perishable Foods	78
Table 52	Mean daily amount of energy and selected nutrients obtained from Foods of Little Nutritional Value	81
Table 53	Mean daily amount of energy and selected nutrients obtained from Convenience Perishables	83
Table 54	Mean energy intake (Calories per day) from food groups and Food Mail categories	85
Table 55	Mean fat intake (grams per day) from major sources	86
Table 56	Mean saturated fat intake (grams per day) from major sources	87
Table 57	Mean vitamin A intake (RE per day) from major sources	88
Table 58	Mean folate intake (mcg per day) from major sources	89
Table 59	Mean calcium intake (mg per day) from major sources	91
Table 60	Mean iron intake (mg per day) from major sources	92
Table C-1	Mean energy and nutrient intakes by Food Mail category, Repulse Bay	C-1
Table C-2	Mean energy and nutrient intakes by Food Mail category, Pond Inlet	C-3

List of Figures

Figure 1	Communities selected for the 1997 nutrition survey and southern food entry points	6
Figure 2	Smoking rates among all women and pregnant and lactating women, Repulse Bay and Pond Inlet, 1992 and 1997	23
Figure 3	Percent energy from fat, Repulse Bay and Pond Inlet, 1992 and 1997	55
Figure 4	Vitamin A intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997	58
Figure 5	Folate intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997	61
Figure 6	Calcium intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997	63
Figure 7	Iron intake as a percent of RNI for all women, 1992 and 1997	66
Figure 8	Country food as a source of energy, 1992 and 1997	70
Figure 9	Country food as a source of protein, 1992 and 1997	70
Figure 10	Country food as a source of fat, 1992 and 1997	71
Figure 11	Country food as a source of vitamin A, 1992 and 1997	71
Figure 12	Country food as a source of iron, 1992 and 1997	72
Figure 13	Nutritious Perishables as a source of vitamin A, 1992 and 1997	75
Figure 14	Nutritious Perishables as a source of folate, 1992 and 1997	76

Figure 15	Nutritious Perishables as a source of calcium, 1992 and 1997	76
Figure 16	Non-perishables as a source of energy and carbohydrate, Repulse Bay	79
Figure 17	Non-perishables as a source of energy and carbohydrate, Pond Inlet	79
Figure 18	Foods of Little Nutritional Value as a source of energy and nutrients, Repulse Bay and Pond Inlet, 1997	82
Figure 19	Mean folate intake from perishable fruits and vegetables, Repulse Bay and Pond Inlet	90

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Executive Summary

As part of the mandate of the Department of Indian Affairs and Northern Development (DIAND) to evaluate the impact of the Food Mail Program on food consumption, nutrition, food security, and health of Aboriginal people in isolated communities, nutrition surveys of Inuit women aged 15 to 44, a nutritionally high-risk group, were undertaken in Repulse Bay and Pond Inlet in 1997. These communities were selected because they had participated in the nutrition surveys conducted by DIAND in 1992. The surveys took place in the spring of 1997 and involved 207 women.

The survey included a 24-hour recall, a food frequency questionnaire, questions regarding food security and changes in food affordability compared to five years ago, and a questionnaire on health, lifestyle and socio-economic conditions.

The changes made to the Food Mail Program have reduced the cost of nutritious perishable food. However, the total cost of a northern nutritious food basket has increased since 1992 in both of these communities, and food security remains a serious issue for many families, especially for those on social assistance and the working poor. Half of the respondents in both communities reported there was not enough to eat in the house in the previous month – an improvement in Repulse Bay since 1992. In both communities, there was some improvement in the perception of food security for most families in the community. However, people felt differently when asked about change in food security in their own household. About half of the respondents in Repulse Bay and almost 40% of those in Pond Inlet who had an opinion on change in food affordability felt they were less able to feed their family now than five years ago, far exceeding the number who were finding it easier. While about 40% of women in both communities in 1992 and 1997 were extremely concerned about not having enough money for food, the percentage of women who were not concerned about this had increased from about 20% to about 30%. Country food access does not appear to be a problem for most families, and few women were extremely concerned about the safety of country food.

A number of health and nutrition concerns continue to exist for women of childbearing age, especially for women who are pregnant or lactating. About 20% of women in both communities said their health was fair or poor, compared to 6% of Canadian women of the same age group. There was a notable improvement in self-rated health in Pond Inlet and a marked deterioration in Repulse Bay. Over 80% of women were smoking, including about two thirds of pregnant and lactating women in Repulse Bay and almost 80% of such women in Pond Inlet. Smoking increases the risk of low birthweight and the risk for a number of diseases for both mother and infant, and interferes with the absorption of folate and vitamin C. The rate of low birthweight (<2500 grams) in the past two years was much higher in both communities than in southern Canada.

In both communities, mean intakes of folate and calcium were much lower than recommended, especially among pregnant and lactating women, and much lower than among women of this

age group in southern Canada. Such low intakes may place some women of childbearing age at risk. The low consumption of organ meats and country fat, together with a low consumption of vegetables, fruit and dairy products, continues to make it difficult for some women to meet the recommended intakes for vitamin A, folate and calcium.

A high fat and saturated fat intake and a Body Mass Index (BMI) over 27 increase the risk of cardiovascular disease. The percentage of energy from fat appears to have increased in both communities, and exceeded the recommended limit. Since 1992, the percentage of women with a BMI over 27 has increased from 37% to 48% in Repulse Bay and from 18% to 32% in Pond Inlet. The high incidence of high birthweight (4000 grams or more) in Repulse Bay may be related to the prevalence of maternal obesity and may signal an increase in the risk of non-insulin dependent diabetes among these women and their offspring.

This survey did not find any significant change in nutrient intakes, except for an increase in vitamin A in Repulse Bay. Women in Pond Inlet continued to have a significantly higher intake of folate than women in Repulse Bay, chiefly because of a higher consumption of perishable fruits and vegetables.

In both years, Pond Inlet women reported a higher consumption of country food compared to those in Repulse Bay and, consequently, a higher intake of protein and iron. Country food consumption was not related to socio-economic status. However, in both communities, country food consumption was significantly lower among women under 25 years of age. Iron intake was significantly lower among women under 25 in Pond Inlet. There is also evidence of a lower iron intake among younger women in Repulse Bay.

Since 1992, there has been no change in the consumption of Foods of Little Nutritional Value. Women continue to obtain approximately 20 to 25% of energy from these foods. In 1997, there was no significant difference in the consumption of these foods by socio-economic status in either community. However, in Pond Inlet, women under 25 years of age reported a higher consumption of these foods than women aged 25 to 44.

In both communities, there has been a significant decline in the consumption of Non-perishable Foods and an increase in the consumption of Miscellaneous perishables, mainly pizza. It appears that women are following a North American trend away from basic foods, like bannock, towards frozen prepared foods, without a major nutritional benefit. While we were unable to demonstrate an increase in the consumption of Nutritious Perishable Foods in general since 1992, these foods were the major source of calcium, vitamin A, folate and saturated fat in both communities and have become a more important source of calcium in Repulse Bay.

Canada Post data support our findings that the consumption of Nutritious Perishable Foods was about 40% higher in Pond Inlet than in Repulse Bay in 1997. However, the 24-hour recall indicated no statistically significant increase in consumption of these foods in either community since 1992, while Canada Post reported an increase in per capita shipments between 1992-93 and 1997-98 of 66% in Repulse Bay and 26% in Pond Inlet. This could mean that our survey

periods were not typical or that groups other than women of childbearing age, such as children, tourists or non-Inuit, account for the increase.

The 24-hour recalls did not indicate an increase in the consumption of fruits and vegetables between 1992 and 1997. However, the food frequency questionnaire for the previous month suggests that women in both communities, especially in Pond Inlet, were consuming more of these foods than in 1992. This suggests there may have been more improvement in nutrient intakes than is apparent from the 24-hour recall.

Women in Pond Inlet reported a significantly higher consumption of fruits and vegetables compared to Repulse Bay. They also noted improvements in the quality and variety of fruits and vegetables, while women in Repulse Bay found no improvement in the past five years. This difference may contribute to a lower consumption of these foods in Repulse Bay and suggests the need for improvements to the transportation system in this region or for better retail storage and handling of these products.

In Pond Inlet, there was some evidence of a positive relationship between socio-economic status and total energy and folate intakes in 1997. Also, in 1997, women in relatively well-off families in Pond Inlet reported a significantly higher consumption of perishable fruits and vegetables than women from working poor families or those on social assistance, contributing to a significantly higher intake of folate from these foods. Vitamin A intake, mostly from perishable vegetables, was also significantly higher among women in well-off families in Pond Inlet.

The lack of a strong relationship between energy intake and socio-economic status may be related to the Inuit system of sharing with extended family members. Relatively well-off families reported running out of money to buy food less often, but between one third and one half of the women who ran out of money "borrowed" food from family or friends. Also, income levels are generally low in both communities, making it more difficult to establish a relationship with income.

Removal of fried chicken from the program in 1996 resulted in significant price increases, especially in Pond Inlet. However, the findings on the consumption of fried chicken were inconclusive.

Based on this survey, changes made to the Food Mail Program since 1992 do not appear to have achieved the intended improvements in nutrient intakes or food consumption patterns. Increases in the cost of rent, non-food items, Non-perishable Foods and Foods of Little Nutritional Value have offset price reductions for Nutritious Perishable Foods. Income is definitely a factor in the consumption of perishable fruits and vegetables in Pond Inlet. However, the fact that socio-economic status bears no relationship to the consumption of Foods of Little Nutritional Value leads one to suspect that Inuit women may be willing to purchase fruits and vegetables only if they can afford to do so after buying the desired amount of Foods of Little Nutritional Value. This may explain why fruits, vegetables and dairy products have not replaced Foods of Little Nutritional Value. Possibly the intended behavioural changes will take more time,

as people become more familiar with these foods and their preparation and more knowledgeable about the nutritional merits of these foods.

Increasing the subsidy for perishable foods that provide calcium, folate and vitamin A may encourage increased consumption of these foods. Beyond the merits of these specific nutrients, there is mounting evidence of the importance of fruits and vegetables in overall health and in preventing cardiovascular disease and cancer. Therefore, promotion of these foods may play a critical role in improving health and reducing health care costs in the North. If nutrition is to improve, Inuit women will need to increase their consumption of fruit, vegetables and dairy products and reduce their consumption of Foods of Little Nutritional Value. More intensive nutrition education efforts by regional and territorial nutritionists may be necessary if the Food Mail Program is to meet its nutrition and health objectives. Since women under 25 are eating more Foods of Little Nutritional Value and less country food than older women, greater nutritional benefits might be realized by targeting educational efforts towards younger women.

This survey found that the average consumption of fruit and vegetables was over twice as high in Pond Inlet as in Repulse Bay. This was the most important factor in accounting for the higher intakes of folate and fibre found in Pond Inlet. The fact that perishable fruit and vegetables cost about 45% more in Repulse Bay than in Pond Inlet in 1997 must have contributed to this difference. The higher cost in Repulse Bay may reflect differences in surface transportation costs incurred in shipping these foods to the food entry points (i.e., to Churchill for Repulse Bay, and to Val-d'Or for Pond Inlet), regional differences in wholesale prices, differences in spoilage and loss during transportation and at the retail level, different competitive environments, and different retail pricing policies. It was not within the scope of this study to investigate these price differences.

One cannot reasonably generalize these findings to other Inuit communities or to the First Nation communities that use this program. These findings do, however, provide a scientific basis for action. Recommendations are offered for areas warranting further analysis and action.

It is important that studies such as this do not add to the sense of helplessness and frustration experienced by families living in these communities by pointing out problems and comparing communities in their nutrition and health status. Given the serious nutrition and health concerns raised in this study, the only ethical rationale for undertaking such research must be to improve the health and nutrition of this population. Surely, this is the expectation of those who participate at the community level. Such research cannot be justified merely as a monitoring exercise. If no action – or inappropriate action – is taken based on the results of these surveys or on a misunderstanding of the results, DIAND's credibility in managing food security issues throughout the North could be seriously compromised.

BACKGROUND

Shortly after the Department of Indian Affairs and Northern Development (DIAND) assumed responsibility for the administration of the Northern Air Stage Program (an air transportation subsidy provided to Canada Post for a service commonly known as "Food Mail") in 1991, major changes to the communities and foods eligible for the program and to the postage rate structure were introduced. All isolated northern communities became eligible for the program, Foods of Little Nutritional Value were formally eliminated from the program and a uniform postage rate was phased in for Nutritious Perishable Food. These changes were made in order to focus the subsidy on foods that must be shipped by air, with the objective of improving nutrition and health in isolated communities.

The new postage rates were implemented gradually, beginning in October 1991, when the rate for Nutritious Perishable Food was reduced in the Northwest Territories (NWT) from $2.10 to $1.50 per kilogram, plus $0.75 per parcel. By the winter of 1991, communities in the Keewatin, Kitikmeot and Inuvik regions of the NWT and northern Labrador also began to receive Food Mail. On October 1, 1992 the postage rate for Nutritious Perishables was further reduced in the NWT and Yukon to $1.20 per kilogram.

The Air Stage Subsidy Monitoring Program was undertaken in 1992 and 1993 to determine the impact of these changes on food prices, food consumption, nutrient intake and health. This review had three major components: (1) a food price survey in 24 isolated communities eligible for the subsidy as well as staging points and relevant southern centres; (2) a food consumption survey of women aged 15 to 44 in eight isolated communities in the NWT, Labrador and Ontario in the spring of 1992 and 1993; and (3) an analysis of data obtained from the Santé Québec Health Survey among the Inuit of Nunavik conducted in the fall of 1992.

The 1992/1993 price surveys found that, where competition existed, the reductions in postage rates in the NWT had resulted in a significant decline in the price of nutritious perishable foods.[1] The food consumption survey identified food security as a major concern of women in these communities. It also found low intakes of calcium, vitamin A and folate, especially among pregnant and lactating women, a high consumption of Foods of Little Nutritional Value and differences in nutrient intake, access to country food and food security among communities.[2]

In July 1993, the postage rate for Nutritious Perishable Food was further reduced to $0.80 per kilogram in the NWT and Yukon, thereby achieving the uniform rate that is still in effect for these foods. In May 1996, further refinements to the Northern Air Stage Program were announced by the Minister of Indian Affairs and Northern Development, to take effect in August 1996. A new Food Mail category was introduced – Convenience Perishables – which included high-fat convenience foods, such as fried chicken. This category no longer qualified for the program. A description of the Food Mail categories is included in Appendix A.

Food prices surveys conducted by DIAND found the cost of nutritious perishable food had declined by 10% in Repulse Bay and 20% in Pond Inlet between 1992 and 1997 (Table 1). However, total food costs, as measured by the cost of the Northern Food Basket, had increased by 2% in Repulse Bay and by 2.5% in Pond Inlet since 1992. Between 1992 and 1997, monthly "after-shelter" income for a family of four on social assistance increased by 5% in Repulse Bay and 10% in Pond Inlet. For families on social assistance, the percentage of after-shelter income required to purchase this basket declined by three percentage points in Repulse Bay and seven percentage points in Pond Inlet (Table 2). While food affordability for families on social assistance had improved, a family of four would have had only $49 a month in Repulse Bay and $65 in Pond Inlet left for clothing, personal needs, cigarettes, transportation, household supplies, recreation and other purposes after purchasing the Northern Food Basket. For those families not on social assistance, housing costs (rent, electricity, fuel, water) increased substantially in 1996, and now account for approximately 25% of family income.

Table 1. Weekly cost of a northern nutritious food basket for a family of four, 1991 to 1997*

Survey period	Perishable foods		Non-perishable foods		Northern Food Basket	
	Repulse Bay	Pond Inlet	Repulse Bay	Pond Inlet	Repulse Bay	Pond Inlet
September 1991	$142	$144	$125	$123	$267	$267
April/May1992	$133	$119	$121	$119	$254	$238
February/March 1993	$119	$111	$127	$130	$245	$241
April/May1997	$119	$95	$140	$150	$260	$245

* Reference family consists of a man and woman (aged 25 to 49 years), a boy (aged 13-15 years) and a girl (aged 7-9 years). The total cost was calculated from unrounded figures for perishable and non-perishable foods.
Source: DIAND, unpublished data

Table 2. Percent of after-shelter social assistance income* required to purchase the Northern Food Basket for a family of four, 1991 to 1997

Year	Repulse Bay	Pond Inlet
September 1991	104%	113%
April/May1992	99%	101%
February/March 1993	92%	98%
April/May1997	96%	94%

* Includes basic allowance (food, clothing, personal care), Family Allowance, Child Tax Credit or Child Tax Benefit and GST Credit. Excludes income and expenditures for housing, utilities and special needs.
Source: DIAND, unpublished data

In 1997, the difference between the cost of perishables in the two communities was chiefly due to the cost of fruits and vegetables (Table 3). These foods cost about 45% more in Repulse Bay than in Pond Inlet.

Table 3. Weekly cost of perishable fruits and vegetables for a family of four, 1992 and 1997*

Food group	April/May 1992		April/May 1997	
	Repulse Bay	Pond Inlet	Repulse Bay	Pond Inlet
Fruits	$35	$29	$30	$22
Vegetables	$36	$29	$26	$17
Total	$70	$58	$56	$39

* As calculated for the Northern Food Basket. The total cost was calculated from unrounded figures for fruits and vegetables.
Source: DIAND, unpublished data

Canada Post reported a substantial increase in the volume of shipments of Nutritious Perishable Food to these communities between 1992-93 and 1997-98 (Table 4).

Table 4. Kilograms of Nutritious Perishable Food shipped per capita

Community	1991-92	1992-93	1993-94	1997-98
Repulse Bay*	35	80	91	133
Pond Inlet	104	144	189	182

* Repulse Bay was not eligible for food mail service until October 1991.
Source: Per capita figures prepared by DIAND, based on estimated population, from data provided by Canada Post

OBJECTIVES

Nutrition surveys were repeated in 1997 in two Inuit communities. The objectives were (a) to determine if changes to the Northern Air Stage Program introduced since 1992 have resulted in changes in food security, food consumption, particularly the consumption of Nutritious Perishable Foods, nutrient intakes and health of women of childbearing age as well as their perceptions of food security; and (b) to assess the influence of other factors that may have contributed to changes in food security, food consumption, nutrition and health over this period.

STUDY DESIGN AND METHODOLOGY

Community Selection and Timing of the Surveys

In consultation with federal, territorial and local government officials and the Advisory Committee, and following community visits, we selected Repulse Bay and Pond Inlet, two communities receiving Food Mail (Figure 1). The surveys were planned to take place in April in Repulse Bay and May in Pond Inlet to correspond to the timing of surveys conducted in 1992. The surveys were carried out in late April and early May in Repulse Bay and in late May and early June in Pond Inlet. The survey in Pond Inlet in 1993 was in March.

Study Population

To measure change since 1992, we selected the same population group, that is, all Inuit women of childbearing age (15 to 44). This age/sex group is still considered to be nutritionally vulnerable, and to be more reliant on store-bought foods than older groups. Also, the health of this group and their ability to satisfy their nutritional requirements has a bearing on the health of future generations.

Most nutrition surveys exclude pregnant women because of the difficulties in data analysis. As in earlier surveys, we included pregnant women for two reasons: (1) Northern communities have a high birth rate, and pregnant women thus constitute a substantial segment of the population; and (2) this group is believed to be at the greatest nutritional risk.

The following women were excluded from the study:

- Women within two weeks of childbirth (most of these were in hospital outside the community during this time).
- Women not residing in the community (away at school, for example).
- Women who were ill during the entire period of the survey and were unable to eat a normal diet.
- Women who were conducting the interviews.

Women were identified through community lists provided by the hamlet councils. The lists were reviewed by community representatives and interviewers before the start of the interviews and a final list of study subjects was compiled.

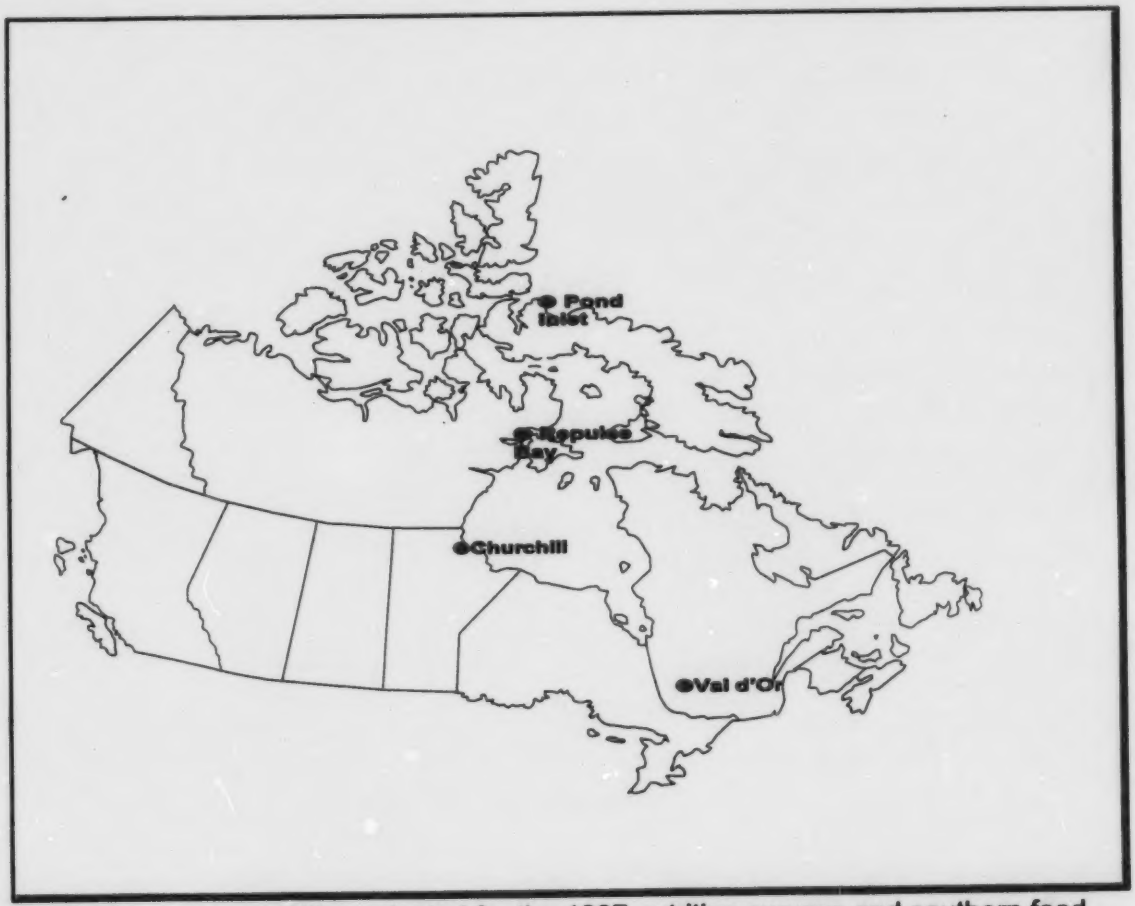

Figure 1. Communities selected for the 1997 nutrition surveys and southern food entry points

Consultations

We held consultations with territorial, local and federal government representatives. The questionnaire was sent to these representatives and to the special Advisory Committee established by DIAND for approval prior to finalization. We encouraged community participation through meetings with the hamlet council and local radio interviews.

Assessment Tools

Nutrition survey questionnaire

The nutrition survey questionnaire included a 24-hour recall, a food frequency questionnaire (frequency of consumption of country foods and store foods over the past month) and a general questionnaire including socio-demographics, food security and perceptions regarding food security and food consumption patterns, health and lifestyle. New questions were added to assess the highest level of education in the household, to determine the impact of the hunter support program, perceptions regarding food affordability of those receiving social assistance and perceived changes in food affordability compared to five years ago. Changes were also made to questions regarding employment and sources of income in order to improve the response rate and clarify the results.

The questionnaire was translated into the Baffin dialect and was available in an English or bilingual format. Food models developed by the Bureau of Nutritional Sciences, Health Canada and used in the Nova Scotia Nutrition Survey were used for the 24-hour recall and food frequency questionnaire.

24-hour recall: Respondents were asked by a trained interviewer to recall all food and beverages consumed over the past 24 hours. Detailed descriptions of each food or beverage, including the cooking method and brand names, if possible, were carefully recorded. Quantities were estimated using food models. The survey kits included standardized volume measures in graduated shapes (e.g., mounds), surface area models for sliced food, thickness indicators, graduated glasses and coffee mugs, an assortment of spoons and package labels for fruit drink crystals, fruit drinks and fruit juice available in the community. Interviewers were also provided with a list (compiled by the interviewers) of foods and brand names for each of the retail stores. Respondents were asked to recall any nutritional supplements (and their Drug

Identification Number) that they usually take and their consumption of these products during the past 24 hours.

Food frequency questionnaire: To overcome the limitations of a single 24-hour recall, we also administered a food frequency questionnaire, which was designed to obtain information about the frequency of consumption and usual serving size of specific country and store foods consumed over the past month.

The previous food frequency questionnaire was modified to reduce the number of foods, to exclude store foods with very low consumption and to include more country foods and country fats. To improve accuracy, food models were again used to describe usual serving size, and package labels were used to clearly identify different types of fruit drink crystals and to distinguish between fruit juice and fruit drinks.

Training

The training manual used in the 1992 and 1993 nutrition surveys was updated to reflect changes to the questionnaire. The interviewers were fluent in both English and Inuktitut. Interviewers attended a five-day training program where they received training in general interviewing skills, in special interviewing techniques for the 24-hour recall and the food frequency questionnaire and in the proper use of the food models. The training also covered screening methods, the survey objectives and protocol.

Administration of the Questionnaire

Respondents were screened by the interviewers using a specially designed profile form in order to eliminate those who did not qualify for reasons of age, health or proximity to childbirth. The purpose of the survey was explained to each respondent. Respondents who were willing to participate signed a consent form in English or Inuktitut before proceeding with the interview. The questionnaire was administered by local interviewers either in English or in the local dialect, according to the respondent's preference. The response rate was 89% in Repulse Bay and 85% in Pond Inlet.

DATA ANALYSIS

The Bureau of Nutritional Sciences, Health Canada entered the data and analysed nutrients in the 24-hour recall using the 1991 Canadian Nutrient File and the CANDI system. For a number of country foods, the Bureau compiled data from the scientific literature and the Alaska Area Native Health Service. All the data from the questionnaire were analysed using Microsoft Excel, Access or SPSS.

The information obtained from the 24-hour recall was analysed by community according to 13 food groups and according to five Food Mail categories (Appendix B) – Nutritious Perishable Foods, Non-perishable Foods, Foods of Little Nutritional Value (LNV), Convenience Perishables and Country Food. The Convenience Perishable category was announced in May 1996 and these foods eliminated from eligibility in August 1996. Country Meat, Birds and Fish were treated as a separate category in the Meat, Poultry, Fish group and Country Fats as a separate category within the Fats and Oils group. Miscellaneous foods included those which did not fit easily into any food group (e.g., pizza, frozen combination dinners, canned beef stew, macaroni and cheese dinner, seasonings, baking powder, yeast, soups, sauces, tea, coffee). The LNV category includes foods which do not qualify for the subsidy. Most of these foods are high in sugar, salt or fat (e.g., soft drinks, potato chips, candy, chocolate bars, fruit drink crystals without vitamin C added, frozen or ready-to-eat sweetened prepared baked goods such as waffles, coffee whitener, popsicles and packaged sandwiches). Convenience Perishables include fresh or frozen products consisting of meat, poultry, fish, vegetables or eggs which are breaded or battered or in pastry, including frozen fried chicken, fish and chips (excluding fish sticks) and meat pies.

Mean intakes of energy and essential nutrients were expressed as a percentage of the 1990 Recommended Nutrient Intake (RNI) established by Health and Welfare Canada[3] for women aged 25 to 49 and for lactating women of the same age group. Calculating the mean as a percent of the RNI enables an evaluation of how adequately the group satisfies its nutrient requirements. For vitamin C, the basic RNI was increased by 50% to meet the needs of smokers. It is important to recognize that an individual is not necessarily malnourished if she does not meet this recommended level, but the lower the percentage of the RNI, the greater the possibility that this is the case. If the group mean intake and percentage of RNI is low, some women would be at risk for that nutrient. However, even if the group mean and percentage of RNI appear to be adequate, individuals within this group may still be at risk.

Nutrient density (mean intake per 1000 Calories) of saturated fat and carbohydrate were also calculated in order to control for differences in energy intake associated with body size and to lessen the effect of extreme values. This method is particularly useful for comparing mean macronutrient intake.

Mean nutrient intake was also analysed according to pregnancy/lactation status, socio-economic group, age, Body Mass Index (BMI) and enrollment in the Hunter Support Program. Differences between communities, survey years, and groups within each community were analysed using chi-square tests for categorical data and t-tests or analysis of variance to examine differences between means of continuous variables.

Due to the small numbers of pregnant and lactating women in each community, the data for all pregnant and lactating women were combined by community for analysis and compared with the RNI for lactating women. This method underestimates the need for iron and folate among pregnant women and overestimates their requirement for vitamin A.

For the food frequency questionnaire, we examined the mean amounts consumed and the percentage of respondents who reported consuming each food.

Questionnaire data were analysed by community, with frequencies, cross-tabulations and means where appropriate. The section of the questionnaire on food security was only asked of respondents who generally buy food for the household.

BMI was used as a measure of weight to height ratio, calculated as weight (in kilograms) divided by height (in metres) squared (w/h^2). The BMI was calculated only for women who were not pregnant. Individuals were also grouped according to BMI category in order to assess the percentage of individuals at risk for cardiovascular disease.

The 24-hour recall data were also analysed for differences in energy and nutrient intakes for respondents who participated in both the 1992 and 1997 surveys.

In the process of designing alternative northern food baskets[4] and in comparing the 1997 survey results with earlier years, a number of inconsistencies were discovered. Results from the 1992 and 1993 nutrition surveys were therefore revised to correct errors and inconsistencies in data entry, such as the calculation of cooked weights for caribou and the classification of foods according to Food Mail category and food group, to reflect changes to the nutrient database since 1992, and to make the previous data consistent with the Food Mail categories as of August 1996.

METHODOLOGICAL CONSIDERATIONS

The 1997 nutrition survey has similar limitations to those of the earlier nutrition surveys, namely the limitations inherent in the use of a single 24-hour recall and food frequency questionnaire as a measure of nutrient intakes.

A single 24-hour recall can generally provide good estimates of the average nutrient intakes of a group provided that the days of the week are equally represented and the subjects are representative of the population under study.[5] However, the distribution of intakes derived from a single 24-hour recall contains both variation between individuals and day-to-day variation for the same individual. As such, these readings cannot be used to represent the distribution of usual intakes. Because of this, the use of percentiles is inappropriate with a single recall, particularly if there is a suspicion that individuals in the study group are binge eaters (eating little one day and a lot the next). A single assessment of nutrient intake and food consumption can suggest areas of concern for the community, but individual assessment of nutritional status and health would require more than one 24-hour recall, together with clinical and biochemical investigation.

In order to be able to estimate the distribution of *typical* intakes, at least some of the surveyed individuals would have to provide more than one 24-hour recall. The required number depends on the sampling methodology being used and the nutrients of interest. For most nutrients, a minimum of two 24-hour recalls administered on non-consecutive days is considered necessary. It is also recommended that the data from multiple recalls be statistically adjusted to account for intra-individual variation.[5] Since this survey used a single 24-hour recall, the analysis will be limited to mean intakes.

In small Aboriginal communities that rely upon country food and where the type of country food varies by season, the entire community can be eating similarly at the same time, if a particular country food is especially plentiful. This would tend to distort the group means and the results may not be typical of an entire year's consumption. This variation will be greater for nutrients such as vitamin A, vitamin D, cholesterol and linoleic acid, which are concentrated in a few foods. Although some authors suggest that seasonal variation in the consumption of traditional foods may affect nutrient intake,[6] others have not found any significant seasonal difference in nutrient intake, despite differences in the type of traditional foods consumed.[7 8] Since our entire survey was completed during a two-week period in the spring in each community, the nutrient intakes found may not be representative of all seasons.

Both the 24-hour recall and the food frequency questionnaire are widely used in dietary surveys. Both instruments are subject to errors associated with the respondent's willingness and ability to provide accurate information. The 24-hour recall takes less time and, therefore, is less burdensome for the respondent. It generally underestimates energy intake, while the food frequency overestimates energy intake.[5] However, the 24-hour recall provides more accurate estimates of energy and nutrient intakes than the food frequency questionnaire. The food frequency questionnaire, on the other hand, is more suited to capturing infrequent or seasonal consumption of foods. This instrument is considered a reliable method of estimating the relative frequency of consumption of foods and of determining food consumption patterns for individuals or groups and the percentage of the population consuming specific foods.

The accuracy of the 24-hour recall depends largely on the interviewer's skill to elicit a complete description of all foods and beverages consumed over this period through probing techniques and the use of appropriate food models. Both instruments are susceptible to errors of over- or underestimation of portion size.[5] Memory for portion sizes is poor for both instruments, and these errors are made at the time of consumption. The degree of error varies among foods and is influenced by the perceived social acceptability of the food. People also vary portion sizes over time, and predetermined portion sizes used on a food frequency may not be suitable for all respondents, making it more difficult for some to estimate consumption.

The food frequency questionnaire relies on "remote memory" to retrieve consumption information over a longer period of time, where many distinct eating episodes are merged into autobiographical sequences. This type of recall tends to be based on typical meal and snack patterns rather than recall of the specific quantities of foods eaten over the period. Respondents may also make errors in recalling the frequency, be unclear about the anchor points of the reference period and have a greater tendency to forget foods than on the 24-hour recall. The more remote the reference period, the more likely the respondent is to report usual rather than actual intakes. It is easy for respondents to report the frequency of consuming foods that are eaten very frequently or that are rarely or never eaten. Recalling the frequency of consuming foods in the middle range of frequencies, however, is a more complex task.

Measuring change in nutrient intake or food consumption patterns requires baseline data. The 1992 nutrition survey provided information on nutrient intake and food consumption patterns of the women aged 15 to 44 in each of these communities for comparison with 1997, but not for the period prior to the initial changes in the Food Mail Program when the postage rates were $2.10 per kilogram.

Another limitation is the validity of the BMI as a measure of body fat for the Inuit population. For people of a short stocky build or those with a dense bone structure, the BMI may overestimate body fat.

The accuracy of the information also depends on the skill of the interviewers. As in earlier surveys, women were selected as interviewers, since they were considered better able to handle some of the more sensitive questions. The interviewer training was again conducted in English – a second language for most interviewers. However, the local Inuit coordinator was present to translate instructions where necessary, to participate in role-playing and to share her previous experience as an interviewer. The Baffin dialect presented a few difficulties for interviewers in Repulse Bay, but the local coordinator was able to make the necessary corrections to the questionnaire.

Since many of the interviewers had previous experience with nutrition surveys, they had little difficulty with the use of the food models or the interpretation of the questionnaire. As in earlier surveys, the interviewers were faced with many challenges – few telephones, long distances between houses and crowded homes. During the survey in Pond Inlet, a group of teenagers was stranded on an ice flow for a few days. The rescue effort and potential tragedy were uppermost in the minds of everyone in the community. This made it difficult for interviewers to approach women, consequently reducing the response rate. The survey also took place a little later in the spring in Pond Inlet. With the arrival of warmer weather, many families left the village for day-camping. Nonetheless, the community response was excellent.

RESULTS

Community Profiles

Pond Inlet, located on the northern tip of Baffin Island, has a population of approximately 1200, making it one of the largest Inuit communities in the Eastern Arctic. Repulse Bay is a community of approximately 700, located in the Keewatin Region of the Eastern Arctic. Both depend on air and marine transportation for food supplies.

Both communities have a local cooperative that owns and operates a grocery store and hotel, and a Northern store operated by the North West Company based in Winnipeg. Jobs in both communities are primarily in government administration, health and social services, seasonal construction, tourism, retailing, carving and crafts.

Socio-demographic Information

Age and marital status

In 1997, 71 women from Repulse Bay and 136 women from Pond Inlet participated in the surveys compared to 62 in Repulse Bay and 116 in Pond Inlet in 1992. The mean age was similar to earlier surveys, 26.7 in Repulse Bay and 27.5 in Pond Inlet. Seventy-six percent of women in Repulse Bay and 62% in Pond Inlet were married or living as a couple.

Education

Education levels have improved since 1992 (Table 5), although they are still much lower than in southern Canada. In 1997, 57% of women in Repulse Bay had only elementary schooling or no formal schooling. Only 11% had any kind of post-secondary education. In Pond Inlet, 30% had no more than elementary schooling, and 28% had some kind of post-secondary education.

Table 5. Respondent age, marital status and education

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total number of respondents	62	71	116	123	136
Mean age	26.1	26.7	25.5	26.4	27.5
Number reporting age	62	68	116	122	134
Marital status (Total N)	62	70	116	113	135
Married or living as couple (%)	60	76	72	66	62
Never married/not living as couple (%)	39	23	28	31	34
Divorced/separated (%)	0	0	1	1	1
Widowed (%)	2	1	0	2	4
Highest level of education completed by respondent (Total N)	62	70	116	122	136
No formal schooling (%)	5	6	3	4	4
Elementary school (%)	84	51	32	47	26
Some high school (%)	10	30	60	39	40
Completed high school (%)	0	1	3	4	2
Some college/vocational/technical (%)	2	4	3	5	19
Completed college/vocational/technical (%)	0	4	0	0	7
Some university (%)	0	3	0	1	1
Completed university (%)	0	0	0	0	1
Adult upgrading (unspecified) (%)	0		0	1	
Highest level of education completed in household (Total N)		70			136
No formal schooling (%)		1			2
Elementary school (%)		40			20
Some high school (%)		41			35
Completed high school (%)		6			9
Some college/vocational/technical training (%)		4			21
Completed college/vocational/technical training (%)		4			9
Some university (%)		3			3
Completed university (%)		0			2

Employment, income and household composition

Social assistance continues to be a major source of income. Fifty-four percent of women in Repulse Bay were in households receiving social assistance, compared to 45% in Pond Inlet. Income levels of families not receiving social assistance were generally low. However, income levels reported in Repulse Bay for families not on social assistance were higher than in Pond Inlet, and more households in Repulse Bay had someone earning income from various sources than in Pond Inlet (Table 6). Employment Insurance (formerly Unemployment Insurance) was a more important source of income for Pond Inlet families, whereas more women in Repulse Bay were in families receiving assistance from the Hunter Support Program.

Comparison of income information with earlier years is difficult since "family income" included social assistance income in 1992 and 1993, but not in 1997. In 1997, income levels were obtained only for families not receiving social assistance, and income included take-home pay from work, fishing, hunting, trapping, carving, sale of crafts, Employment Insurance, net income from running a business and pensions over the past month.

In 1997, respondents were divided into three socio-economic groups depending on whether they received social assistance, income level and family size (Table 7). The percentage of women in "working poor" families was considerably higher in Pond Inlet than in Repulse Bay.

Table 6. Employment and household income, 1997

	Repulse Bay	Pond Inlet
Adults (age 15 and over) usually eating in the home (N)	201	338
Percent earning money from selling furs or sealskins	10	2
Percent earning money from carving or crafts	15	5
Percent with a job or business	29	27
Households providing information on income sources (N)	63	120
Percent with someone earning money from selling furs or sealskins	32	5
Percent with someone earning money from carving or crafts	46	12
Percent with someone with a job or business	70	61
Percent with someone with income from at least one of the above	92	69
Women in families receiving Employment Insurance in past month (n)	4	17
Percent of women in families receiving Employment Insurance in past month	6	13
Women in households providing information on family income last month (Total N)	69	121
Women in families receiving social assistance last month (n)	37	54
Percent of women in families receiving social assistance last month	54	45
Women in families not receiving social assistance last month (n)	32	67
Percent of women in families not receiving social assistance and earning:		
$1,500 or less	13	31
$1,501 to $2,000	7	10
$2,001 to $2,500	20	7
$2,501 to $3,000	4	2
$3,001 to $4,000	1	4
>$4,000	0	2
Women in families providing information on Hunter Support (Total N)	64	130
Percent receiving Hunter Support	25	9

Table 7. Distribution of women by socio-economic group, 1997

	Repulse Bay	Pond Inlet
Women classified by socio-economic group (Total N)	69	121
Received social assistance in past month (%)	54	45
Working poor* (%)	28	43
Relatively well-off (%)	19	12

* Working poor families: not on social assistance and family size 1, 2 or 3 with monthly income <$1500; family size 4 or 5 with monthly income <$2000; and family size 6+ with monthly income <$2500.

In both communities, a mean of approximately three adults and three children usually ate in the home in 1997 (Table 8). The reported mean monthly rent for families not on social assistance was $324 in Repulse Bay and $310 in Pond Inlet.

Table 8. Household composition and number of persons usually eating in the home

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Number of households in sample	49	63	100	104	121
Households providing information on household size		63			120
Average household size		6.0			5.6
Households providing information on number of adults and children eating in the home	49	63	100	100	121
Mean number of adults eating in the home	3.9	3.2	2.7	3.2	2.8
Mean number of children eating in the home	3.7	3.3	2.6	3.0	2.8

General Health and Lifestyle

Personal assessment of health

Since 1992, self-rated health status has markedly declined in Repulse Bay and notably improved in Pond Inlet (Table 9). The percentage of women in Pond Inlet who rated their health as "excellent" was three times as high as in 1992. Only 3% of women in Repulse Bay rated their health as "excellent" compared to one third of women in Pond Inlet in 1997. About a fifth of women in both communities still rate their health as "fair" or "poor". In contrast, the 1996-1997 National Population Health Survey reported that

28% of Canadian women of the same age group rated their health as "excellent" and only 6% rated their health as "fair" or "poor".[9]

Table 9. Personal assessment of health

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	60	71	115	123	135
Percent reporting health status as:					
Excellent	21	3	11	16	33
Very good	19	10	13	17	15
Good	37	66	37	44	33
Fair	19	16	34	22	19
Poor	3	6	4	2	2

Medical conditions, pregnancy and lactation

Women were asked in 1997 if the doctor or nurse had told them that they had any of a number of medical conditions. Sixteen percent of women in each community reported a medical condition other than food allergies and difficulty digesting milk (Table 10). In Repulse Bay, women reported the following conditions: difficulty digesting milk (4), food allergies (4), anaemia (2), kidney disease (2), chronic bronchitis (2), cancer (2), diabetes (1), high blood pressure (1), heart disease (1), ulcers (1) and other (6). In Pond Inlet, reported conditions included difficulty digesting milk (11), food allergies (8), high blood pressure (6), ulcers (4), anaemia (3), diabetes (2), heart disease (2), cirrhosis (1), kidney disease (1), cancer (1) and other (7).

The percentage reporting medical conditions had increased in Repulse Bay since 1992. However, in 1992, only women who said they had been told they had a "health problem" by the doctor or nurse were asked about specific medical conditions. Therefore, the data for 1992 would have underestimated the prevalence of difficulty digesting milk and food allergies, and may also have underestimated the percentage who had any other medical conditions.

Approximately one quarter of the sample in Repulse Bay and one third in Pond Inlet were either pregnant or lactating, with relatively more lactating than pregnant women in

both communities. Since 1992, the percentage of women breastfeeding has almost doubled in Repulse Bay and declined slightly in Pond Inlet.

Table 10. Women reporting medical conditions, pregnancy and lactation

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Number of respondents	62	71	116	123	136
Women reporting medical conditions (excluding food allergies and difficulty digesting milk) (%)	10	16	14	11	16
Pregnant (Total N)	60	65	113	123	132
Yes (%)	8	11	8	12	8
Breastfeeding (Total N)	62	67	111	120	132
Yes (%)	10	18	30	23	24

Body Mass Index (BMI)

A BMI over 27 is associated with increased risk of developing cardiovascular disease, while a BMI between 20 and 25 is considered within the "healthy" range. The average BMI in Pond Inlet was 25.3, compared to 24.7 in 1992 (Table 11). In Repulse Bay, however, the BMI increased from an average of 27.0 to 28.5. Since 1992, the percentage of women with a BMI over 27 has increased significantly in both communities, reaching an alarming rate of 48% of women in Repulse Bay and 32% in Pond Inlet. In 1996-97, the comparable estimate for Canadian women aged 15 to 44, excluding the territories, was 16%.[10]

Table 11. Body Mass Index (BMI)

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
BMI* (Total N)	54	56	96	94	98
<20.0 (%)	9	2	8	7	2
20.0 - 24.9 (%)	35	30	48	57	46
25.0 - 27.0 (%)	19	20	26	15	20
>27.0 (%)	37	48	18	20	32
Mean BMI (kg/m^2)	27.0	28.5	24.7	24.7	25.3

* Excluding pregnant women and women not reporting height and weight.

Number of births and birthweight

There were 22 children born to respondents in Repulse Bay in the past two years, with a mean birthweight of 3195 grams. In Pond Inlet, 46 children were listed as born to respondents in the past two years, with a mean birthweight of 3160 grams.

The percentage of infants with a birthweight of less than 2500 grams was 9.1% in Repulse Bay and 15.2% in Pond Inlet. Although women were asked if they had given birth to any children in the past two years and how much each child weighed at birth, we do not know if the respondents included low birthweight infants who did not survive. There is a possibility that these infants would not be counted in reply to this question, but we felt that it would be too intrusive to probe further. In 1993, the incidence of low birthweight was 4.9% for the Keewatin region and 7.7% for the Baffin region.[11] In contrast, the incidence of low birthweight was 5.7% for Canada and 5.5% in the NWT in 1996.[12]

High birthweight infants (4000 grams or more) accounted for 13.6% of births in Repulse Bay and 4.3% in Pond Inlet. This compares with a rate of 15.3% in the Keewatin and 9.3% in the Baffin region in 1993.[11] In 1996, the incidence of high birthweight was 15.4% in the NWT and 12.4% in Canada.[12]

Both low and high birthweight pose a health risk for the infant. Low birthweight is associated with early neonatal death. It increases the risk for poor development, cerebral palsy, mental retardation and lower intelligence and places the infant at greater risk for respiratory infections.[13 14 15 16] High birthweight is strongly associated with

maternal obesity and, to a lesser extent, with gestational diabetes.[17] Gestational diabetes carries significant health risks for mother and infant and increases the risk for the mother of developing non-insulin-dependent diabetes at a later date.[18 19 20] High birthweight is clearly associated with increased death rates for mother and infant.[21]

Smoking

Smoking is an important risk factor in cardiovascular disease and cancer of the lung, oesophagus and kidney.[22] Smoking during pregnancy is the most clearly established "preventable" risk factor of low infant birthweight,[16] contributing to "small for gestational age," premature birth, spontaneous abortion, respiratory distress syndrome and sudden infant death syndrome. Long-term effects include poor cognitive performance and decreased physical growth.[23]

In 1997, smoking rates continued to be much higher in both communities than for Canadian women in general. In Repulse Bay, the rate increased from 76% in 1992 to 83% (Table 12, Figure 2). In Pond Inlet, 84% of women were smoking in 1997. This rate was somewhat lower than in 1992, but higher than in 1993. In Pond Inlet, the smoking rate was a little lower among pregnant and nursing women than in 1992. However, two thirds of pregnant and nursing women in Repulse Bay and almost 80% in Pond Inlet were smoking. In 1993, the Government of the Northwest Territories reported 81% of Inuit women were smoking.[11] In contrast, only 28% of Canadian women smoked in 1995, and only 16% smoked during pregnancy.[24]

Since 1992, there has been no change in the mean age at which women begin to smoke (12 to 14 years), but there appears to be fewer women in Repulse Bay smoking at least 25 cigarettes per day.

Table 12. Smoking

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	60	69	116	123	135
Current smoker (%)	76	83	89	79	84
Every day (%)	65	74	84	77	79
Occasionally (%)	11	9	5	3	5
Ex-smoker (%)	2	9	4	3	4
Never smoked (%)	23	9	7	18	13
Mean age started smoking (Total N)	50	62	103	96	117
Mean age (years)	14	14	12	12	12
Number of cigarettes per day (Total N)	47	57	100	95	114
Percent of smokers reporting:					
Less than 11	58	61	52	40	49
11-24	34	37	39	46	43
25+	9	2	10	14	8

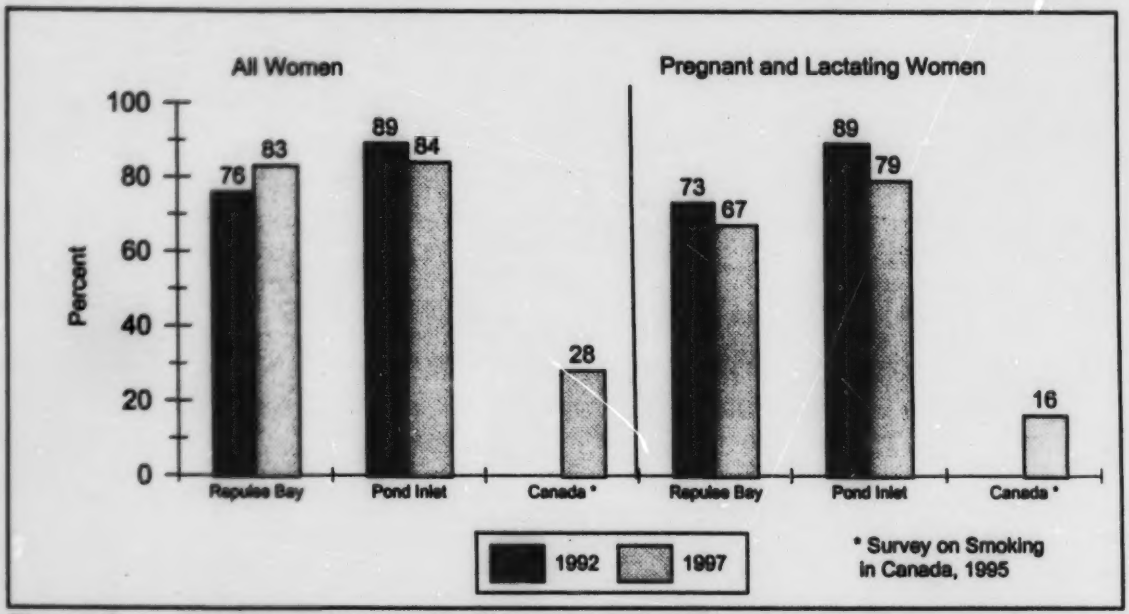

Figure 2. Smoking rates among all women and pregnant and lactating women, Repulse Bay and Pond Inlet, 1992 and 1997

Activity level

Most women were moderately active and more active when out on the land. Pond Inlet women were generally more active than women in Repulse Bay (Table 13). This is not surprising since Pond Inlet has a more rugged terrain than Repulse Bay.

Table 13. Self-reported activity level

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Activity level in the village (Total N)	60	70	113	122	135
Percent reporting they:					
Usually sit, do not walk around	15	17	16	15	16
Stand, walk quite a lot, no heavy loads	55	54	40	37	40
Lift/carry light loads, climb hills, stairs	18	19	25	34	30
Do heavy work or carry heavy loads	7	3	10	4	6
Don't know	7	7	11	10	9
Time spent on the land in the past year (Total N)	60	70	115	122	136
Percent reporting they spent:					
None	31	34	29	59	57
<1 month	40	37	47	28	32
1 month	16	19	9	9	8
2 - 3 months	11	4	10	3	2
4 months or more	2	6	3	1	2
Activity level on the land (Total N)	43	48	82	50	60
Percent reporting they:					
Usually sit, do not walk around	0	6	10	6	10
Stand, walk quite a lot, no heavy loads	70	52	34	36	42
Lift/carry light loads, climb hills, stairs	21	27	32	42	35
Do heavy work or carry heavy loads	7	6	19	6	10
Don't know	2	8	5	10	3

Since 1992, there has been little change in the amount of time spent on the land in Repulse Bay. However, compared to 1992, fewer women in Pond Inlet were spending time on the land. About half of Pond Inlet women said they did not spend any time on the land in the past year compared to only about 30% who said so in 1992. This change may reflect changes in social structure (e.g., more women working at office

jobs). In 1997, more women in Repulse Bay than in Pond Inlet were spending time on the land.

We were unable to find any relationship between BMI and self-reported activity level. However, this question deals with perceptions regarding activity level and cannot be considered an objective measure of physical activity.

Social issues of concern

Participants were asked to rate their degree of concern ("not concerned", "a little concerned", "extremely concerned") on a number of social problems, including "not enough jobs in the community" (Tables 14 and 15).

Table 14. Percent of respondents "not concerned" about specific social issues

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	115	122	136
Alcohol or drug abuse (%)	66	76	36	38	51
Not having enough money for food (%)	23	32	17	19	29
Not being able to get country food (%)	55	70	60	69	61
The safety of country food (%)	61	65	54	67	60
Family violence (%)	65	76	38	44	58
Not enough jobs in the community (%)		18			11

Table 15. Percent of respondents "extremely concerned" about specific social issues

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	115	122	136
Alcohol or drug abuse (%)	10	13	28	30	18
Not having enough money for food (%)	40	39	42	56	39
Not being able to get country food (%)	10	16	12	8	10
The safety of country food (%)	18	18	15	13	11
Family violence (%)	13	14	31	27	18
Not enough jobs in the community (%)		66			63

In both communities, fewer people were concerned about not having enough money to buy food. Still, approximately 40% were extremely concerned about this issue. The only issue of greater concern was the lack of jobs in the community. Approximately two thirds of women were extremely concerned about the lack of jobs. Alcohol and drug abuse and family violence were of concern to about half of women in Pond Inlet compared to only a quarter in Repulse Bay, although the degree of concern seems to have lessened in Pond Inlet since 1992. From 35 to 40% of women had concerns about the safety of country food, but only 18% of women in Repulse Bay and 11% in Pond Inlet were extremely concerned about this.

Food Security

Food "insecurity" is an emerging issue among nutritionists in Canada and the United States. Its measurement has become a priority for many Canadian and American health organizations.[5 25 26] Food insecurity is defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."[27 28]

Information on food security was obtained only from those who generally purchased food for the household. The majority of the women interviewed did so. When this was not the case, the major food purchaser responded to this section of the questionnaire.

Perceptions about food security

The general perceptions of food security were similar for both communities (Table 16). Approximately half of respondents felt that most people in the community (whether or not they were on social assistance) could not afford to purchase enough food to feed their families. This marks an improvement in both communities, particularly in Pond Inlet where 70% of women in 1992 felt that most people could not afford to buy enough food to feed their family. In Pond Inlet, women in families receiving social assistance appeared to have a more positive view of affordability, both for those on social assistance and in the community generally. In Repulse Bay, there was no difference in the perception of food affordability between those on social assistance and other women.

Over 80% of respondents in both communities felt that most families had access to country food year round. Access to country food would appear to be less of a concern in Repulse Bay than in the spring of 1992.

Table 16. Perceptions about food security in the community

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Most people in community can afford to buy enough food to feed their families (Total N)	48	62	79	95	117
Agree (%)	35	47	30	28	49
Disagree (%)	65	53	70	72	51
Most families who are on social assistance in the community can afford to buy enough food to feed their family (Total N)		62			118
Agree (%)		45			49
Disagree (%)		55			51
Most families in this community are able to have country food year round (Total N)	48	62	79	99	117
Agree (%)	63	81	87	95	84
Disagree (%)	38	19	13	5	16

Changes in food affordability in the past five years

Approximately one half of food purchasers in Repulse Bay and 40% of those in Pond Inlet who had an opinion on change in food affordability felt they were *less able* to afford to feed their family compared to five years ago (Table 17). Changes in food costs were the largest single reason given for this deterioration in their ability to feed their family. About 40% found no change. Only about 10% of respondents with an opinion in Repulse Bay and 20% in Pond Inlet felt it was easier to feed their family. Changes in income were primarily seen as responsible for improvements. In Repulse Bay, one of the five women who found it easier credited the Hunter Support Program, while this program was not mentioned as helpful to families in Pond Inlet.

Table 17. Ability to feed family compared to five years ago

	Repulse Bay		Pond Inlet	
	Number	%	Number	%
Ability to feed family compared to five years ago (Total N)	63		120	
More able to afford to feed family	5	12	19	19
Less able to feed family	22	54	38	39
No change	14	34	41	42
Don't know	22		22	
Reasons MORE able to feed family (Total N)*	5		19	
Changes in food cost	0	0	1	5
Changes in social assistance	0	0	1	5
Changes in income	3	60	12	60
Changes in rent	0	0	2	10
Changes in family size	0	0	2	10
Hunter Support Program	1	20	0	0
Other	1	20	2	10
Total	5	100	20	100
Reasons LESS able to feed family (Total N)*	22		38	
Changes in food cost	16	52	20	36
Changes in social assistance	2	6	4	7
Changes in income	2	6	7	13
Changes in rent	2	6	5	9
Changes in family size	9	29	15	27
Other	0	0	5	9
Total	31	100	56	100

* Each respondent had up to three reasons recorded

Food insufficiency and food insecurity

In 1997, approximately half of the women were in households reporting not enough to eat in the house in the past month (Table 18). For Repulse Bay, this was a significant improvement over 1992 when two thirds of households reported this problem. For Pond Inlet, there had been little change since 1992, but a significant improvement over 1993.

In Repulse Bay, a higher percentage of women in families on social assistance reported not enough to eat in the house than either of the other two socio-economic groups. In Pond Inlet, this was more prevalent among women in families on social assistance and the working poor (Table 19).

Table 18. Reported food insufficiency and food insecurity

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Not enough to eat in the house last month (Total N)	61	71	91	115	133
Yes (%)	66	48	54	67	53
No (%)	28	39	44	31	41
Don't know (%)	7	13	2	2	5
Run out of money for food (Total N)	61	71	93	116	133
Yes (%)	98	82	87	88	81
No (%)	2	14	12	12	17
Don't know (%)		4	1		2
Number reporting frequency of running out of money for food in the past year (Total N)	45	40	61	78	79
Percent reporting:					
Less than once a month	4	25	15	6	9
Once a month	33	45	16	24	27
2 to 4 times per month	49	30	53	62	56
More than 4 times per month	13	0	16	8	9

Table 19. Count of women in households reporting "not enough to eat in the house last month" by socio-economic group, 1997

Socio-economic group	Repulse Bay			Pond Inlet		
	Yes	No	Total	Yes	No	Total
Social assistance	19	11	30	28	19	47
Working poor	8	9	17	32	20	52
Relatively well-off	5	8	13	3	12	15
Total	32	28	60	63	51	114
			p=.27			p=.01

More than 80% of women were in households that reported running out of money to buy food (Table 18). Fewer women in both communities were in this situation in 1997 than in 1992. Of the women who reported a frequency, about a third of those in Repulse Bay and about two thirds in Pond Inlet reported running out of money to buy food at least twice a month in the past year. Families on social assistance and the working poor reported running out money to buy food more frequently than well-off families ($p<.01$) (Table 20). However, even relatively well-off families in both communities reported running out of money to buy food.

Table 20. Count of women in households reporting "running out of money to buy food" (for Repulse Bay and Pond Inlet combined) by socio-economic group

Socio-economic group	Yes	No	Total
Social assistance	80	7	87
Working poor	60	11	71
Relatively well-off	14	13	27
Total	154	31	185

Approximately two thirds of households dealt with this problem by asking the store manager for more credit, representing a large increase in the number of families in Pond Inlet seeking more credit compared to 1992 (Table 21). Also, over a third of Pond Inlet families said they "did without" in 1997, compared to only 22% in 1992. It appears that doing without food is much more common in Pond Inlet than in Repulse Bay.

About a third of families in Repulse Bay and half of families in Pond Inlet borrowed basic food from family or friends when they ran out of money to buy food. This practice, while part of Inuit tradition, can, in a market-based economy, place considerable strain on those who are considered more affluent.

Table 21. Ways of dealing with problem of running out of money to buy food

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Number reporting a way of dealing with the problem	47	53	68	91	95
Percent who said they:					
Ask social assistance for more money	11		22	35	14
Ask store manager for more credit	79	64	25	40	69
Borrow basic food from family/friends	53	36	60	42	49
Go hunting or fishing	17	13	32	13	15
Ask help from doctor or nurse		2		1	1
Do without	4	6	22	8	37
Make carving or craft to sell	19	30	13	15	11
Other		9	3	16	8

Note: Some respondents offered more than one way.

Access to country food

Over 90% of women in Repulse Bay and 85% of women in Pond Inlet were able to get country food year round (Table 22). In Repulse Bay, employment of the hunter and a lack of money for gas or snowmobile repairs were the major obstacles to country food access, while in Pond Inlet, not having a snowmobile and not being able to afford gas were the most important obstacles cited.

Table 22. Reported access to country food

	Repulse Bay	Pond Inlet	
	1997	1993	1997
Able to get country food all year round (Total N)	71	114	134
Yes (%)	92	89	85
No (%)	3	9	10
Don't know (%)	6	2	4

Nutrition training

Nine percent of women in Repulse Bay and 22% in Pond Inlet reported receiving some nutrition training during the past five years. The nature of this training was not explored.

Food Consumption Patterns

Country Food

According to the 24-hour recall, the average daily consumption of all country food in 1997 was 139 grams in Repulse Bay and 229 grams in Pond Inlet (Table 23). In both 1992 and 1997, country food consumption was significantly higher in Pond Inlet than in Repulse Bay. There was no statistically significant difference in mean consumption of country food between 1992 and 1997 in Pond Inlet although the mean was a little lower in 1997. In Repulse Bay, the mean quantity appears to be much lower than in 1992, but, given the small sample size and wide variation in consumption among individuals, it is not possible to say with statistical certainty that country food consumption has declined in this community ($p=.16$). The lower mean in 1997 could simply be the result of chance.

Both the 24-hour recall and the food frequency questionnaire suggested a decline in the total quantity of country meat, birds and fish consumed in Repulse Bay. However, since country foods vary widely in energy, it may be more appropriate to compare energy values rather than quantities as a measure of change. In terms of energy, there was no statistical evidence of a decline in the consumption of country food in Repulse Bay ($p=.34$), but there was some evidence of a decline in the consumption of country meat, birds and fish ($p=.09$). Country fat would not normally be considered separately from meat and, therefore, it is more appropriate to look at changes in energy from country food in total.

According to the 24-hour recall, there was no evidence of a decline in country food consumption in terms of quantity or energy in Pond Inlet. The food frequency questionnaire, on the other hand, suggests a decline in both communities since 1992 (Table 24).

Table 23. Mean daily consumption (grams) of country food: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	116	123	136
Caribou meat, fresh/frozen	120	93	163	143	111
Caribou, dried			6	2	1
Polar bear	43				2
Rabbit				1	
Seal meat, fresh/frozen	25		22	36	20
Walrus, fresh/aged			13	5	6
Muktuk, raw		4	28	2	32
Muktuk, aged			9	13	
Meat, total	188	97	241	202	171
Geese					15
Birds, total					15
Arctic char, fresh/frozen	15	37	24	8	40
Halibut				2	
Fish, total	15	37	24	11	40
Seal liver				1	
Liver, total				1	
Meat, birds, fish, total	203	133	265	214	227
Caribou fat			0.4		1.9
Narwhal fat/blubber, aged				1.0	
Walrus fat		6.0		0.2	
Fat, total		6.0	0.4	1.2	1.9
Country food, total	203	139	266	215	229

Table 24. Average weekly consumption (grams) of selected country foods: food frequency questionnaire

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Food					
Caribou, fresh/frozen/aged, total	844	531	878	723	839
Caribou dried	17	21	40	49	23
Muskox	0	0	0	0	1
Polar bear	25	14	25	30	27
Rabbit	4	1	5	8	5
Seal meat, fresh		18			49
Seal meat, frozen		1			1
Seal meat, aged		0			5
Seal meat, fresh/frozen/aged, total	90	19	355	107	55
Seal meat, dried	4		4	0	
Walrus meat, aged		7			37
Walrus meat, frozen		2			3
Walrus meat, fresh/aged, total	23	9	39	48	40
Muktuk, raw		57			51
Muktuk, aged		23			37
Muktuk, total	110	79	374	30	88
Meat, total	1118	674	1720	995	1077
Ptarmigan	5	3	14	3	3
Geese, dried	1	0	0	0	0
Geese/Ducks, fresh/smoked	4	0	14	4	
Birds, total	10	3	28	6	10
Arctic char, aged		0			3
Arctic char, frozen		199			184
Arctic char, fresh		88			64
Arctic char, fresh/frozen/aged, total	208	287	290	114	251
Arctic char, dried	9	7	15	0	6
Halibut	0	0	0	3	0
Trout, fresh/smoked	0	7	0	1	1
Whitefish	0	2	0	0	0
Fish, total	217	304	306	117	259

Table 24. Average weekly consumption (grams) of selected country foods: food frequency questionnaire (continued)

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Food					
Eyes (caribou, seal, fish)		0		17	2
Beluga liver		0			0
Caribou liver		11			17
Seal liver		2			6
Walrus liver		0			0
Liver (caribou, seal, walrus)				19	
Liver, total		12		19	24
Country meat, birds, fish, total	1344	994	2054	1154	1371
Beluga fat/blubber		1			14
Caribou fat		55			48
Misirak		5			10
Narwhal fat/blubber, aged		0			17
Polar bear fat					7
Seal fat/blubber		3			28
Walrus fat		5			14
Fat (seal, walrus, polar bear)				31	
Fat, total		68		31	138
Country food, total	1344	1062	2054	1185	1509

According to the 24-hour recall and the food frequency questionnaire, the most important country foods were caribou, followed by Arctic char and muktuk. Both instruments indicate a higher consumption of muktuk and seal in Pond Inlet than in Repulse Bay (Tables 23 and 24). Although seal and polar bear were not reported on the 24-hour recall in Repulse Bay, the food frequency questionnaire reports consumption of both foods during the previous month, although in lower quantities than in Pond Inlet. The food frequency questionnaire also suggests that women are consuming a greater variety of country foods than reported on the 24-hour recall, including aged meats or fats such as seal, walrus, muktuk and Arctic char, as well as small amounts of rabbit, dried caribou, ptarmigan and other species of fish (trout, halibut, whitefish).

On the 24-hour recall, women in Repulse Bay had a higher average consumption of country fat than women in Pond Inlet. However, the food frequency questionnaire suggests a higher consumption of fat from marine mammals during the previous month in Pond Inlet than in Repulse Bay.

Based on perceived changes in food consumption over the past five years, about 30% of women in Repulse Bay and 40% in Pond Inlet felt that they were eating more caribou and few reported eating less (Tables 25 and 26). This perception contradicts the findings of the 24-hour recall and the food frequency questionnaire. There was also some tendency towards a perception of eating less seal and walrus meat and muktuk in both communities, as well as less caribou liver in Repulse Bay and less other liver in Pond Inlet. Otherwise, they perceived their consumption of country foods to be relatively unchanged. In both communities, only about 15% of women ate caribou liver and less than 5% ate caribou kidney. There was a higher percentage of women in Repulse Bay who did not eat seal meat, muktuk and liver (other than caribou).

Table 25. Perceived changes in country food consumption over the past five years, Repulse Bay, 1997

	Total N	Don't eat %	More %	Less %	Same %
Caribou meat	71	0	31	7	62
Seal meat	71	30	7	13	51
Walrus meat	71	59	3	14	24
Beluga meat	71	97	1	0	1
Narwhal meat	71	96	3	1	0
Arctic char	71	16	12	18	54
Caribou liver	71	82	0	10	9
Other liver	71	73	4	6	17
Caribou kidney	71	96	0	3	1
Muktuk (beluga, narwhal)	71	24	14	20	42
Seal blubber or fat	71	69	1	11	18

Table 26. Perceived changes in country food consumption over the past five years, Pond Inlet, 1997

	Total N	Don't eat %	More %	Less %	Same %
Caribou meat	136	1	40	15	43
Seal meat	135	6	8	15	71
Walrus meat	135	64	2	8	26
Beluga meat	135	92	1	2	5
Narwhal meat	135	82	2	2	14
Arctic char	136	10	14	17	59
Caribou liver	136	85	2	4	9
Other liver	135	56	2	12	31
Caribou kidney	135	96	0	2	3
Muktuk (beluga, narwhal)	134	10	5	17	67
Seal blubber or fat	134	57	4	8	31

Dairy Products

This food group contains only dairy products purchased as such. Since it does not include cheese contained in pizza, macaroni and cheese dinner, packaged cheese sandwiches or cheeseburgers, it would underestimate total cheese consumption.

In 1997, women in both communities reported a very low consumption of these foods – a little less than half a serving, compared to the two to four servings recommended for women in Canada's Guidelines to Healthy Eating.[29] Perishable Dairy Products continued to be more popular than non-perishable (Table 27). In Repulse Bay, the most important Dairy Products, in descending order, were fluid 2% milk, evaporated milk, ice cream, yogurt and processed cheese. In Pond Inlet, the most important Dairy Products were fluid 2% milk, yogurt, evaporated milk, ice cream and processed cheese. Approximately half of women in Repulse Bay and a quarter of those in Pond Inlet said they do not consume fluid milk. Those that do reported little change over the past five years (Tables 35 and 36).

Table 27. Mean daily amount (grams) of major Dairy Products consumed: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	116	123	136
Perishable					
Milk, fluid, including chocolate	13.4	18.2	24.7	34.9	20.5
Powdered milk, dry			0.2	0.3	0.2
Cheese, natural (cheddar, mozzarella, parmesan)	0.4	1.8	4.7	2.5	1.6
Processed cheese	2.1	2.0	0.6	1.6	3.4
Ice cream	10.3	7.7	12.0	4.5	5.1
Yogurt		2.9	2.3		10.6
Non-perishable					
Evaporated milk, undiluted	6.5	8.6	15.7	10.1	5.4

Store Meat, Poultry, Fish, Eggs and Alternates

Store Meat, Poultry and Fish were much less important than country food in both communities. In 1997, the mean consumption of all store Meat, Poultry and Fish (including frozen fried breaded chicken) was 77 grams in Repulse Bay and 100 grams in Pond Inlet (Table 28). Both the 24-hour recall and the food frequency found frozen fried breaded chicken, other chicken and ground beef to be the most popular foods in this group (Tables 28 and 29). In general, the store meats most frequently consumed were low in iron and fairly high in saturated fat.

According to the 24-hour recall, frozen fried breaded chicken accounted for approximately 31% of all store Meat, Poultry and Fish consumed in Repulse Bay and 44% in Pond Inlet in 1997. This product has not been eligible for the Food Mail Program since August 1996. Between 1992 and 1997, the price of a 900 gram package of assorted pieces of fried chicken increased by about $6 in Pond Inlet and by about $2 in Repulse Bay. By 1997, this product cost between $16 and $19 in Pond Inlet and about $12 in Repulse Bay. Removal of this product and other Convenience Perishables from the program in 1996 had a greater impact on prices in Pond Inlet, since air cargo rates to this community are much higher than rates to Repulse Bay.

Table 28. Mean daily amounts (grams) of major store Meat, Poultry, Fish, Eggs and Alternates consumed: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	116	123	136
Store Meat, Poultry, Fish					
Perishable					
Chicken/turkey	9	15	15	8	11
Beef, ground or frozen beef patties	14	7	10	10	18
Beef, chuck/rump/cross-rib	7	1	11		
T-bone steak	9		4	2	3
Pork chops	1	4	17	2	6
Spareribs	6	5	5		
Wieners		3	2	3	6
Packaged luncheon meat (bologna, ham, salami, etc.)	8	3	1	2	1
Fish sticks, frozen	3	5			2
Nutritious Perishable, total	58	45	65	30	47
Frozen fried breaded chicken (Convenience Perishable)	5	24	31	18	44
Store Meat, Poultry, Fish, perishable (including fried chicken), total	63	69	96	48	91
Non-perishable					
Fish, canned		3		2	2
Luncheon meat, canned	6	5	2	7	5
Non-perishable, total	6	8	2	8	6
Store Meat, Poultry, Fish (excluding fried chicken)	64	53	67	38	53
Store Meat, Poultry, Fish (including fried chicken)	69	77	97	56	100
Eggs	5	13	14	8	7
Alternates					
Nuts	4.6		2.7	1.3	0.5
Peanut butter	0.5		0.1	0.4	0.3

Table 29. Average weekly amounts (grams) of store Meat, Poultry and Fish consumed: food frequency questionnaire

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Chicken broilers/fryers (breast, leg, wing), total	214	105	191	241	184
Fish sticks, frozen	18	18	15	6	13
Beef patties, frozen	9	NA	70	66	NA
Beef, ground	87	108	118	132	128
Packaged luncheon meat (ham, salami, etc.)	71	18	38	2	48
Pork chops	48	59	109	94	86
T-bone steak	29	37	35	27	36
Wieners	66	98	66	107	118
Frozen fried breaded chicken	107	76	221	261	139
Canned pink salmon	49	32	15	14	10
Canned sardines	19	3	26	30	10
Luncheon meat, canned	86	18	63	63	70

Despite this higher cost, frozen fried breaded chicken was the single most important store meat. The increase in the mean amount consumed according to the 24-hour recall between 1992 and 1997 was not statistically significant. The food frequency questionnaire, however, suggests a decline in the consumption of fried chicken since 1992 (Table 29). Also, in response to a question regarding changes in the consumption of specific store foods over the past five years (Tables 35 and 36), 23% of women in Repulse Bay and 35% in Pond Inlet reported eating less fried chicken, while only 4% said they were eating more. The decline recorded on the food frequency questionnaire for Pond Inlet between 1993 and 1997 may indicate that consumption did reach a higher level following reductions to Food Mail rates in July 1993, but has declined since August 1996, when these products became ineligible for the Food Mail Program. It is also possible that the 1997 food frequency questionnaire may have underestimated the total consumption of fried chicken, since respondents may not have included boneless chicken pieces. Since boneless pieces have become a more popular choice, the trend apparent from the food frequency questionnaire may not reflect changes in the total amount of fried chicken consumed.

Eggs and Alternates were not consumed in large quantities in either community.

Cereal Products

This food group includes all bread and cereal products that are eligible for the Food Mail Program. Ready-to-eat sweet products such as cakes, muffins and frozen waffles are considered Foods of Little Nutritional Value and are treated under that category.

Average daily consumption of all Cereal Products in 1997 was 76 grams in Repulse Bay and 94 grams in Pond Inlet. Since 1992, there has been little change in the consumption of perishable Cereal Products (Table 30). Among perishable foods, white bread and rolls are the most popular. No whole grain bread was reported in Repulse Bay and only a small amount in Pond Inlet. The consumption of non-perishable Cereal Products has declined since 1992, primarily due to a drop in the consumption of flour and, in Repulse Bay, macaroni and spaghetti. It is possible that some of the macaroni reported in 1992 in Repulse Bay may have been macaroni and cheese dinner, which is treated in this report as a Miscellaneous food. Among non-perishable foods, flour and rice were the most important foods reported in Repulse Bay, and pasta, rice and flour the most popular in Pond Inlet.

Table 30. Mean daily amount (grams) of major Cereal Products consumed: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	116	123	136
Perishable					
White bread/rolls/bagels/English muffins	17	16	23	12	24
Bread, whole grain			-	1	1
Oatmeal, cooked	5		3	3	3
Fried rice, frozen				4	
Perishable, total	22	16	27	19	28
Non-perishable					
Crackers	4	-	1	2	2
Pilot biscuits	5	4	8	13	5
Flour	32	22	29	65	13
Ready-to-eat breakfast cereal	2	4	4	4	3
Macaroni and spaghetti, cooked	60	8	21	16	24
Rice, cooked	7	18	8	13	16
Roll/cake/muffin/pancake mixes	2	2	1	7	3
Non-perishable, total	93	60	80	124	66

Note: "-" indicates a value less than 0.5 grams

Fruit and Vegetables

Both communities reported a very low consumption of fruits and vegetables (Table 31). Mean daily consumption of all fruits and vegetables in 1997 was 64 grams (or ½ serving) in Repulse Bay and 164 grams (approximately 1⅛ servings) in Pond Inlet, much less than the 5 to 10 servings recommended by Canada's Guidelines to Health Eating. There was no statistically significant increase in the consumption of fruits and vegetables in either community between 1992 and 1997. However, women in Pond Inlet reported a significantly higher consumption of perishable fruits and vegetables than women in Repulse Bay in both years. The biggest difference was in the perishable Citrus Fruit and Tomatoes group, where Pond Inlet reported an average of 39 grams per day compared to only 6 grams in Repulse Bay.

Both the food frequency questionnaire and the 24-hour recall showed a strong, positive relationship between socio-economic status and the consumption of perishable fruit and vegetables in Pond Inlet. On the 24-hour recall, women in relatively well-off families in Pond Inlet obtained an average of 209 Calories from these foods, compared to 95 Calories among those on social assistance and 73 Calories among the working poor ($p=.01$). There was no relationship between these variables in Repulse Bay.

In both communities, perishable fruits and vegetables were more popular than non-perishable. The most popular perishable fruits and vegetables were frozen French fries, oranges, bananas, frozen mixed vegetables, fruit juice (only in Pond Inlet) and fresh potatoes (only in Repulse Bay). The food frequency questionnaire suggested a higher mean consumption of fruits and vegetables, especially Citrus and Tomatoes, in Pond Inlet than in Repulse Bay. It also validated the preference for perishable fruits and vegetables in both communities, the popularity of French fries and frozen mixed vegetables, and the consumption of a greater variety of perishable fruits and vegetables in Pond Inlet than in Repulse Bay. It also suggests an increase in the consumption of perishable fruits and vegetables in Pond Inlet between 1992 and 1997 (Table 32).

Some similarities as well as some differences between the two communities were also evident in women's perception of changes in their consumption of fruits and vegetables over the past five years (Tables 35 and 36). Women in both communities perceived that they were eating less canned vegetables, and in Pond Inlet, twice as many women said they were eating more fresh or frozen vegetables, other than potatoes, as the number of women who said they were eating less (20% versus 10%). This was not the case in Repulse Bay. Furthermore, in Repulse Bay, about a third or more said that they do not consume frozen juice, fresh or frozen vegetables and canned vegetables and 30% do not eat fresh fruit. Although consumption of fresh or frozen vegetables is still

Table 31. Mean daily amounts (grams) of Fruits and Vegetables consumed: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Total N	62	71	116	123	136
Perishable					
Fruit juice, frozen diluted/fresh (apple, orange)			28	13	27
Oranges/grapefruit	2	5	9	5	14
Apples	2	2	14	13	4
Bananas	6	6	6	8	11
Blueberries					8
Melon	15	1	1		1
Pears, fresh		2	2		3
Other fresh fruit		3	7	2	4
French fries/hash brown, frozen	9	11	12	6	24
Potatoes, fresh, cooked	5	5	14	5	1
Cabbage	3		-	1	1
Carrots, fresh or frozen	2	2	3	2	3
Cucumber					3
Lettuce, iceberg	1	1	1	1	2
Lettuce, Romaine					2
Onions	4	2	4	3	2
Mixed vegetables, frozen		3	12	1	12
Other fresh/frozen vegetables	3	-	6	5	5
Perishable, total	50	43	117	63	126
Non-perishable					
Fruit juice, canned		7	8	18	17
Tomato sauce/paste, canned	-	3	12	4	13
Other canned or dried fruit	2	2	8	1	2
Instant mashed potatoes, dry	2	1	1	-	2
Potatoes, canned			-		
Corn, canned	2	7	6	4	3
Other canned vegetables		2	5	6	2
Non-perishable, total	5	22	40	34	40
Fruits and vegetables, total	55	64	157	96	168

Note: "-" indicates a mean consumption of less than 0.5 grams

Table 32. Percent reporting consumption of selected fruits and vegetables in the past month: food frequency questionnaire

Food	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
	%	%	%	%	%
Oranges	55	54	47	61	79
Tomatoes	29	24	25	32	31
Canned tomatoes	11	6	10	13	13
Fruit juice - frozen, boxes or cartons	27	25	24	71	34
Fruit juice - in cans or bottles	19	20	17	28	24
Apples	68	52	58	85	75
Bananas	82	45	71	80	79
Pears, fresh	13	10	11	7	25
Grapes	48	35	42	47	41
Canned fruit	44	37	38	36	27
Frozen French fries	77	61	67	81	82
Instant mashed potatoes	61	56	53	45	59
Potatoes, fresh, cooked	55	47	47	69	52
Cabbage	23	9	20	27	33
Carrots, fresh or frozen	27	25	24	61	52
Carrots, canned	24	14	21	19	10
Broccoli, fresh or frozen	10	16	8	42	36
Turnips	3	1	3	6	7
Frozen mixed vegetables	23	48	22	64	79
Other frozen vegetables	8	16	7	19	21
Canned peas	37	24	32	33	18
Canned corn	73	51	63	65	53

low in Repulse Bay, more women reported eating these foods in 1997 than in 1992. In Pond Inlet, almost all women reported consuming fresh fruit and over 80% reported eating fresh or frozen vegetables.

The higher consumption of fresh and frozen fruits and vegetables in Pond Inlet may be related to improvements in the quality and variety of these foods. In response to a question concerning changes in the quality and variety of fresh fruits and vegetables over the past five years, 37% of women in Pond Inlet felt that quality had improved and 39% felt that variety had improved over this period. In Repulse Bay, less than 5% of women felt that quality or variety had improved (Table 33). One quarter of the women in Pond Inlet and one third in Repulse Bay did not know if there had been any change.

Table 33. Perception of changes in quality and variety of fruits and vegetables over the past five years

	Repulse Bay	Pond Inlet
Quality		
Total N	68	136
Better (%)	4	37
Worse (%)	9	9
No change (%)	50	29
Don't know (%)	37	26
Variety		
Total N	66	136
More (%)	5	39
Less (%)	12	7
No change (%)	46	25
Don't know (%)	38	29

Fats and Oils

According to the 24-hour recall, the average consumption of store fats and oils was 7.9 grams in Repulse Bay and 9.5 grams in Pond Inlet. The consumption of non-perishable fats and oils declined in both communities. Lard continues to be the most important store fat, although the consumption of salad dressing has increased in Pond Inlet.

Sugar and Sweets

This group includes sugar, syrups, fruit drink crystals with vitamin C, fruit drinks with added vitamin C or at least 25% juice, pudding mixes and gelatin desserts. The most important foods in this group are sugar and fruit drink crystals with vitamin C. Although the 24-hour recall found no change in the consumption of fruit drink crystals since 1992, the food frequency suggests a decline. The average consumption of sugar alone was 15 grams per day in Repulse Bay and 17 grams per day in Pond Inlet. However, consumption of Sugar and Sweets has declined since 1992 in both communities ($p<.01$ in Repulse Bay; $p=.01$ in Pond Inlet).

Miscellaneous Foods

The 24-hour recall found a significant increase in the consumption of Miscellaneous perishable foods (mainly pizza) between 1992 and 1997 (p=.002 in Repulse Bay, p=.03 in Pond Inlet). In Repulse Bay, the average consumption of pizza increased from 8 grams in 1992 to 36 grams per day in 1997. For Pond Inlet, consumption increased from 23 to 33 grams per day over this period.

Between 1992 and 1997, the price of frozen pizza in Pond Inlet had decreased by about 10% at one of the stores and by about 20% at the other. In Repulse Bay, pizza prices had remained essentially the same at one store and had *increased* by almost 20% at the other. Except for the unusually high price at one store in Repulse Bay, a large frozen pizza, weighing about 700 grams, cost between $8.00 and $9.00 in both communities in 1997. The reduction in the price of pizza in Pond Inlet, where prices were higher than in Repulse Bay in 1992, may have contributed to the increase in its consumption. Women in Repulse Bay, on the other hand, who were not eating as much pizza as those in Pond Inlet in 1992, have adopted this food more recently and by 1997 were eating similar amounts of pizza – an average of about two slices a week.

The most important Miscellaneous non-perishable foods (24-hour recall) were coffee, tea, water, macaroni and cheese dinner and canned beef stew. Consumption of canned beef stew and macaroni and cheese dinner was higher in Repulse Bay than in Pond Inlet. Women in Repulse Bay also reported a decline in the consumption of coffee and baking powder compared to 1992.

Foods of Little Nutritional Value

The average daily consumption of Foods of Little Nutritional Value was similar in both communities. The mean energy from LNV foods was not statistically different from 1992 in either community. The most important foods within this group were pop, fruit drink prepared from crystals without vitamin C, potato chips, chocolate bars and packaged sandwiches and burgers.

In 1997, a can of pop cost about $2.00 in both communities. Since 1992, the price had increased by about 30% in Repulse Bay and by about 12% in Pond Inlet, if we disregard the unusually high price at one of the stores in 1992 in Pond Inlet where pop was being flown in after sealift stocks had been depleted.

A large bag or box of potato chips (170 to 200 grams) cost between $3.00 and $4.00 in both communities in 1997, depending upon the brand and store. These prices had increased by about 25% in Repulse Bay since 1992. The price change in Pond Inlet since 1992 cannot be determined reliably because of an unusually low sale price at one of the stores in 1992. Prices of chips at both stores in Pond Inlet in 1993 had also been unusually low for the North – about $2.00 for a large bag.

According to the 24-hour recall, the mean consumption of potato chips was 28 grams in Repulse Bay and 13 grams in Pond Inlet, much less than that reported on the food frequency questionnaire. Both instruments indicate an increase in the consumption of potato chips in Repulse Bay since 1992 (Table 34). In Pond Inlet, the direction of change is less clear, since the 24-hour recall found no change in consumption since 1992 and the food frequency questionnaire suggests an increase. However, 18% of women in Repulse Bay and 37% of women in Pond Inlet felt they were eating more potato chips than five years ago (Tables 35 and 36).

Table 34. Mean daily consumption of potato chips and pop

	Potato chips (grams)		Pop (mL)	
	24-hour recall	Food frequency	24-hour recall	Food frequency
Repulse Bay				
1992	9	34	273	794
1997	28	56	278	534
Pond Inlet				
1992	15	29	270	697
1993	23	54	303	492
1997	13	48	376	609

In 1997, the mean consumption of pop on the 24-hour recall was 278 mL in Repulse Bay and 376 mL in Pond Inlet – again, much less than reported on the food frequency questionnaire. Unfortunately, it is difficult to determine if pop consumption has changed since 1992, since there is no agreement between the 24-hour recall and the food frequency on the direction of change. In Repulse Bay, pop consumption would appear to be unchanged according to the 24-hour recall and to have declined according to the food frequency. There is added uncertainty on this issue in Repulse Bay, since 40% of

women reported they were drinking more pop than five years ago compared to 3% who reported drinking less (Table 35). In Pond Inlet, the 24-hour recall suggests a significant increase in consumption of pop. However, this is not supported by the food frequency questionnaire or the question related to changes in food consumption over the past five years which essentially found no change (Table 36).

The difficulty in estimating the true consumption of these foods may lie with the inherent weaknesses of both instruments. It is well recognized that social acceptability of foods may bias the results of both the 24-hour recall and the food frequency questionnaire. Both instruments tend to underestimate high intakes of foods considered unhealthy or socially unacceptable and overestimate low intakes of healthier foods such as fruit and vegetables.[30 31] Snack foods, such as potato chips and pop, may be perceived as socially unacceptable and, therefore, may be under-reported on either instrument, especially among obese respondents.[32] Since the higher consumption of pop and potato chips reported on the food frequency is more consistent with the high mean BMI in these communities, the food frequency may provide a more accurate picture of usual consumption of these foods.

Although there are no comparable data from other nutrition surveys in Canada, the 1996 Food Expenditure Survey suggests that Canadians purchase an average of 174 mL of pop and 6 grams of potato chips and similar products per day from stores – much less than the average consumption reported by women in these communities.[33]

Perceived changes in food consumption

Tables 35 and 36 present women's perception of changes in their consumption of some specific store foods, as discussed earlier. In addition, in response to an open-ended question on whether they had made any *major* changes in what they were eating in the past five years, approximately one third of women in Pond Inlet and less than a quarter of women in Repulse Bay said they had (Table 37). Three women in Repulse Bay and 19 in Pond Inlet gave a non-specific response of "trying to eat better." Of those reporting specific changes, the most important change was "eating more country food" (10 women in Repulse Bay and 24 women in Pond Inlet). The major reasons for this change were the high cost of store food and trying to eat better.

Table 35. Perceived changes in store food consumption over the past five years, Repulse Bay, 1997

Store Foods	Total N	Don't eat %	More %	Less %	Same %
Milk, fresh or UHT	71	49	13	7	31
Cheese	71	25	11	10	54
Fried chicken	69	25	4	23	48
Other store meat	66	20	8	24	49
Fresh fruit	70	30	14	9	47
Frozen juice	71	42	9	11	38
Canned fruit	71	42	3	14	41
Fresh potatoes	66	29	9	9	53
Other fresh or frozen vegetables	71	34	13	11	42
Canned vegetables	71	32	4	14	49
Cookies	70	23	9	23	46
Candy or chocolate bars	71	11	20	23	46
Pop	71	0	41	3	56
Potato chips	71	6	18	17	59
Frozen pizza	71	32	17	13	38

Table 36. Perceived changes in store food consumption over the past five years, Pond Inlet, 1997

Store Foods	Total N	Don't eat %	More %	Less %	Same %
Milk, fresh or UHT	136	24	15	16	45
Cheese	136	23	11	15	51
Fried chicken	135	19	4	35	43
Other store meat	136	13	14	24	50
Fresh fruit	136	7	24	21	48
Frozen juice	136	37	15	18	31
Canned fruit	135	47	4	17	32
Fresh potatoes	113	24	13	13	50
Other fresh or frozen vegetables	136	16	20	10	54
Canned vegetables	135	49	3	17	31
Cookies	136	25	6	22	47
Candy or chocolate bars	135	13	26	23	38
Pop	136	7	15	23	55
Potato chips	136	4	37	13	46
Frozen pizza	136	8	25	22	45

Table 37. Perception of major changes in food consumption over the past five years

	Repulse Bay		Pond Inlet	
	Number	Percent of respondents	Number	Percent of respondents
Total N	70		134	
Yes	16	23	50	37
No	54	77	84	63
Change				
Eating more country food	10	14	24	18
Eating less country food	2	3	9	7
Trying to eat better	3	4	19	14
Eating less fat			5	4
Eating less salt			3	2
Eating less junk food	1	1	7	5
Eating less sugar	2	3	1	1
Other	1	1	9	7
Total	19		77	

Note: Some respondents indicated multiple changes.

Energy Intake

The RNI for energy is based on the average requirements of a healthy population group of the same age and sex and is aimed at maintaining a healthy BMI. However, it is difficult to determine if this energy intake is adequate for Arctic conditions. Individuals who are very active would require a higher energy intake. Energy requirements also increase during pregnancy and lactation.

Mean energy intake was 7% over the RNI for women in Pond Inlet and 11% less than the RNI in Repulse Bay (Table 38). However, the difference between the observed mean caloric intake of both communities and the RNI of 1900 Calories was not statistically significant due to the small sample size. Also, the decrease in the mean caloric intakes observed between the 1992 and 1997 survey periods was not statistically significant in either community. However, in 1997, the mean caloric intake reported in Repulse Bay was significantly lower than in Pond Inlet (p=.03).

Table 38. Mean energy and macronutrient intake of all women aged 15 to 44

Energy and macronutrients	RNI	Repulse Bay		Pond Inlet		
		Mean intake		Mean intake		
		1992	1997	1992	1993	1997
Total N		62	71	116	123	136
Calories	1900	1972	1696	2180	2125	2037
% RNI		*104*	*89*	*115*	*112*	*107*
Carbohydrate (g)		246	190	221	261	199
Protein (g)	51	106	83	134	106	118
% RNI		*208*	*163*	*263*	*208*	*231*
Fat (g)		61	66	83	72	83
Saturated fat (g)		22.6	19.8	25.5	21.6	25.5
Fibre (g)		5.6	6.0	7.3	7.9	7.2

The low mean energy intake in Repulse Bay is surprising, given the high mean BMI and the percentage of women with a BMI over 27. However, we were unable to find a relationship between BMI and caloric intake, which may suggest, as other authors have found, the possibility of under-reporting by those in the high BMI category. Since the timing of the survey (i.e., the number of women interviewed just prior to receiving social assistance cheques) could influence the amount of food available in the house, this was also investigated. However, no relationship was evident between caloric intake and timing of the survey. The possibility of interviewer bias was also investigated, but this was not found to be a factor. A number of students were stranded on an ice flow while the survey was under way in Pond Inlet. This event was thought to have some effect on nutrient intake of women in the community. However, no discernible effect was found.

There was also no significant relationship between caloric intake and socio-economic status, age or nutrition training, but there was some evidence of a positive relationship between socio-economic group and caloric intake in Pond Inlet ($p=.08$). In Pond Inlet, women with elementary school or less, and those with more than high school, had a significantly lower caloric intake ($p=.02$). This finding is difficult to interpret, but the explanation may lie in under-reporting at either end of the educational spectrum.

We also investigated the relationship between the questions dealing with food security and caloric intake. We did not find a significant association between caloric intake and those who reported not having enough to eat in the house in the past month. However, one would not necessarily expect a woman who had experienced a food shortage in the past month to have a lower energy intake during the previous 24 hours. In fact, if there was plenty of food in the house that day, she may well compensate for shortages on other days by eating more than one who never experiences shortages.

Mean energy intake for pregnant women and lactating Inuit women combined was below the RNI in Repulse Bay (76%) and close to the recommended level in Pond Inlet (Table 39). The numbers of pregnant women in each community are too small to assess by community based on a single day's dietary recall. However, the generally low mean calorie intake of pregnant and lactating women in Repulse Bay suggests that many of the pregnant women may not be meeting energy requirements.

Table 39. Mean energy and macronutrient intake of pregnant and lactating women aged 15 to 44

		Repulse Bay		Pond Inlet		
Energy and macronutrients	**RNI***	**Mean Intake**		**Mean Intake**		
		1992	**1997**	**1992**	**1993**	**1997**
Total N		11	18	40	38	41
Calories	2350	2055	1795	2425	2214	2252
% RNI		*87*	*76*	*103*	*94*	*96*
Protein (g)	73	137	89	143	112	137
% RNI		*188*	*121*	*195*	*154*	*188*
Carbohydrate (g)		217	182	234	275	229
Fat (g)		69	79	100	73	86
Saturated fat (g)		26.0	19.2	29.4	21.9	28.8
Fibre (g)		4.8	5.9	8.0	8.0	9.1

* Based on the RNI for lactating women. This would overestimate the requirements for energy during pregnancy.

Macronutrient Intake

Protein

Mean protein intakes continue to be higher than in southern Canada. Intakes averaged 83 grams in Repulse Bay and 118 grams in Pond Inlet for all women and 89 grams and 137 grams for pregnant and lactating women in Repulse Bay and Pond Inlet, respectively, well in excess of requirements (Tables 38 and 39).

Fat

The traditional Inuit diet of game and sea mammals was high in omega-3 fatty acids and low in saturated fat. Omega-3 fatty acids exert a protective role against cardiovascular disease by thinning the blood, increasing HDL cholesterol and lowering blood triglycerides. This diet, therefore, did not carry the same health risks associated with a high consumption of store-bought meats and poultry. But as the consumption of store foods increases, particularly the consumption of store foods high in fat and saturated fat, traditional foods may no longer exert the same protective effect. For this study, the intakes of omega-3 and monounsaturated fatty acids were not calculated due to missing nutrient data for country foods.

Mean fat intakes were 66 grams in Repulse Bay and 83 grams in Pond Inlet (Table 38). These levels were not statistically different from 1992 and are similar to mean intakes reported by Quebec Inuit women in 1992 (76 grams)[34] and by Inuit women in Broughton Island in 1983-84 (87 grams).[35]

There was no significant difference in saturated fat intake between the two communities or between 1992 and 1997. Mean intakes of saturated fat were 19.8 grams in Repulse Bay and 25.5 grams in Pond Inlet (Table 38). By comparison, mean saturated fat intake for women aged 18 to 34 was 23.5 grams in the Quebec Inuit health survey and 24.4 grams in the Nova Scotia survey.[33 36] On the basis of 1000 Calories, mean saturated fat intake was 11.6 and 12.5 grams for Repulse Bay and Pond Inlet, respectively. This level is similar to that reported for Quebec Inuit women aged 18 to 34 (12.7 grams per 1000 Calories) and lower than that reported for Nova Scotia women of the same age group (14.2 grams per 1000 Calories).[36]

Carbohydrate

Although carbohydrate was not an important source of energy in the traditional Inuit diet, in 1997, mean carbohydrate intake was 190 grams in Repulse Bay and 199 grams in Pond Inlet (Table 38). By comparison, the Quebec Inuit survey and the Nova Scotia survey reported a mean intake of 208 grams and 206 grams, respectively, for women aged 18 to 34.[33,36] Mean intake of carbohydrate per 1000 Calories did not change between 1992 and 1997.

In 1990, Canadian scientists recommended that carbohydrate intake be increased from existing levels to 50 to 60% of calories, and that foods containing complex carbohydrates and fibre (e.g., bread, cereal and pasta, and fruits and vegetables) account for most of the increase since they exert a protective effect against cardiovascular disease.[3] Frequent consumption of simple carbohydrates in the form of fruit drink crystals, soft drinks and especially, sticky candy and gum, is believed responsible for the high prevalence of dental caries and extractions among Inuit children and adolescents. In 1997, simple sugars from the non-perishable Sugar and Sweets category (which includes sugar and fruit drink crystals with vitamin C) and LNV sweets (mostly soft drinks, fruit drink crystals without vitamin C and chocolate bars) combined supplied approximately 40% of total carbohydrate intake in both communities.

There is no recommendation for fibre intake, since the Scientific Review Committee felt that the role of fibre could not be separated from that of complex carbohydrates. It was assumed that if the diet met the recommendation for 50 to 60% of calories from carbohydrate, fibre intake would be satisfactory.[3] In 1997, mean fibre intake was higher in Pond Inlet (7.3 grams) than in Repulse Bay (6 grams) ($p=.10$), due to a higher consumption of fruits and vegetables. Pond Inlet intakes were similar to those reported for Quebec Inuit women aged 18 to 34 in 1992.[33] Mean intake among women of the same age group was 9.6 grams in the 1990 Nova Scotia Nutrition Survey.[36]

Sources of energy

In order to lower the risk of cardiovascular disease, Health Canada recommends that fat intake not exceed 30% of energy, and saturated fat not more than 10% of energy.[3] In 1997, the energy supplied by fat was above the recommended limit in both communities, with fat accounting for 35% of energy in Repulse Bay and 37% in Pond Inlet. This represents an increase in the percentage of calories from fat in Repulse Bay between 1992 and 1997 (Table 40, Figure 3). By comparison, the percent of dietary

energy from fat reported in the Broughton Island study in 1983-84 was 35%.[37] Energy from saturated fat continued to be above the recommended limit in 1997, providing 10.5% of energy in Repulse Bay and 11.3% in Pond Inlet.

In 1997, protein provided 20% of energy in Repulse Bay and 23% in Pond Inlet, levels similar to those found among Quebec Inuit women and higher than usually found in southern Canada.[33 36] Carbohydrate supplied 45% of energy in Repulse Bay and 39% in Pond Inlet, less than the recommended level of 50 to 60% (Table 40).

Table 40. Percent of energy from macronutrients for all women aged 15 to 44

Macronutrient	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Protein	22	20	25	20	23
Carbohydrate	50	45	41	49	39
Fat	28	35	34	31	37
Saturated fat	10.3	10.5	10.5	9.1	11.3

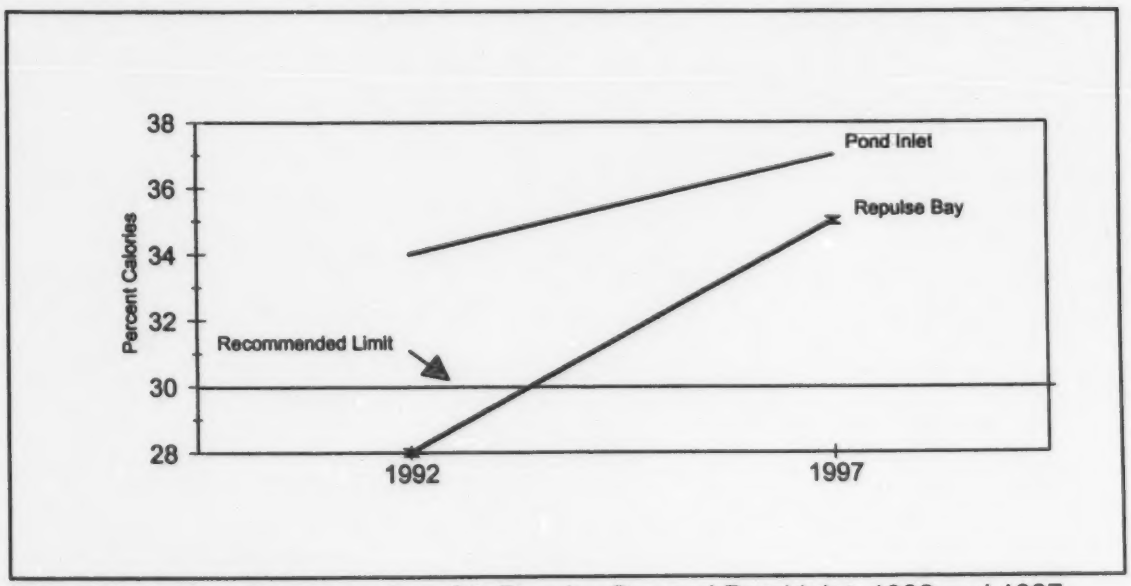

Figure 3. Percent energy from fat, Repulse Bay and Pond Inlet, 1992 and 1997

Micronutrient Intake

As in 1992, mean vitamin intakes met or exceeded the RNI, except for vitamin A and folate (Tables 41 and 42).

Table 41. Mean vitamin intake of all women aged 15 to 44

		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Total N		62	71	116	123	136
Vitamins	**RNI**	**Mean Intake**			**Mean Intake**	
Vitamin A (RE)	800	208	441	697	504	659
% RNI		*26*	*55*	*87*	*63*	*82*
Vitamin C* (mg)	45	51	74	85	59	63
% RNI		*113*	*164*	*190*	*130*	*139*
Thiamin (mg)	0.8	1.21	1.15	1.45	1.42	1.31
% RNI		*151*	*143*	*181*	*177*	*164*
Riboflavin (mg)	1.0	2.09	1.71	2.48	2.43	2.14
% RNI		*209*	*171*	*248*	*243*	*214*
Niacin (NE)	14	43.1	38.3	50.8	44.0	47.4
% RNI		*308*	*274*	*363*	*314*	*339*
Vitamin B_6 (mg)	0.8	1.02	1.19	1.40	1.22	1.42
% RNI		*127*	*149*	*176*	*152*	*177*
Folate (mcg)	185	90	104	127	135	123
% RNI		*48*	*56*	*69*	*73*	*67*
Vitamin B_{12} (mcg)	1.0	10.9	10.3	14.5	12.8	12.9
% RNI		*1095*	*1033*	*1454*	*1279*	*1287*

* RNI includes additional requirement for smokers

Table 42. Mean vitamin intake of pregnant and lactating women aged 15 to 44

		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Total N		11	18	40	38	41
Vitamins	**RNI***	**Mean intake**		**Mean intake**		
Vitamin A (RE)	1200	201	708	794	623	532
% RNI		*17*	*59*	*66*	*52*	*44*
Vitamin C** (mg)	83	29	78	114	43	70
% RNI		*35*	*94*	*137*	*52*	*84*
Thiamin (mg)	1.0	1.29	1.20	1.53	1.47	1.55
% RNI		*129*	*120*	*153*	*147*	*155*
Riboflavin (mg)	1.4	2.59	1.77	2.54	2.77	2.64
% RNI		*185*	*126*	*181*	*198*	*189*
Niacin (NE)	17	50.3	41.9	52.4	47.5	58.6
% RNI		*296*	*246*	*308*	*280*	*345*
Vitamin B_6 (mg)	1.1	0.84	1.39	1.34	1.21	1.81
% RNI		*76*	*126*	*122*	*110*	*165*
Folate (mcg)	285	66	96	138	132	148
% RNI		*23*	*34*	*48*	*46*	*52*
Vitamin B_{12} (mcg)	1.2	9.3	9.6	13.2	14.1	18.5
% RNI		*774*	*797*	*1100*	*1178*	*1546*

* Based on RNI for lactation
** RNI includes additional requirement for smokers

Vitamin A

Vitamin A is essential for maintaining a healthy skin and mucous lining of the nose, throat and urinary tract, and for the functioning of the immune system. It has a special role in preventing night blindness and respiratory and urinary tract infections, and beta-carotene may have a role in preventing certain types of cancer. Vitamin A is found as retinol in fat from fish and mammals, liver, dairy products, poultry, eggs and butter and

as provitamin A, or beta-carotene, in dark green and orange fruit and vegetables and, as an additive, in margarine.

The RNI for women is 800 RE and 1200 RE during lactation – a level considered high enough to meet the needs of most individuals and to maintain liver stores. Since breastfeeding depletes livers stores, additional vitamin A is recommended during lactation.

A number of nutrition surveys have documented low intakes of vitamin A among the Inuit.[2 33 34 38] As Figure 4 illustrates, mean vitamin A intake doubled in Repulse Bay between 1992 and 1997, but still only met slightly more than half of the RNI. In Pond Inlet, intake averaged 659 RE, 82% of the RNI, and was significantly higher than in Repulse Bay (Table 41). For pregnant and lactating women, mean intake was 708 RE in Repulse Bay and 532 RE in Pond Inlet (Table 42). These intakes represent 59% and 44%, respectively, of the RNI for lactation.

In Pond Inlet, vitamin A intake, mostly from perishable vegetables, was significantly higher among women in relatively well-off families (p=.001). Vitamin A intake was not associated with socio-economic status in Repulse Bay.

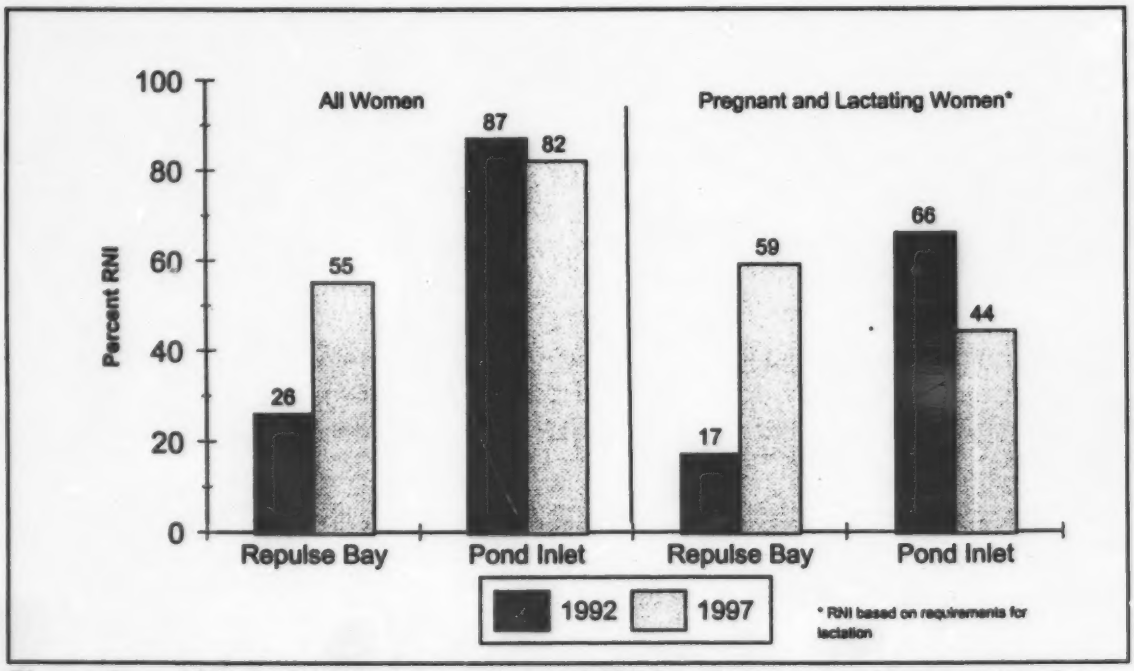

Figure 4. Vitamin A intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997

Vitamin C

Vitamin C is known for its role in preventing scurvy. It also plays an important role in many body processes including the immune system, wound healing and the development of healthy connective tissue. Recommended intakes for women are 30 mg a day, although daily intakes of only 10 mg will prevent scurvy. Since smoking interferes with the absorption of vitamin C, it is recommended that vitamin C intake be increased by 50% among smokers.

Average intakes of vitamin C exceeded recommended intakes for all women (Table 41). Among pregnant and lactating women, intake was close to the recommended level for lactation. Their mean intake would have exceeded requirements for pregnancy (Table 42).

Folate

Folate is essential for the normal development of the nervous system, growth and reproduction and repair of body tissues. It is essential for the normal development of the fetus and may also play a role in preventing cardiovascular disease. Folate status is negatively affected by smoking, alcohol consumption and poor eating habits.[39] Low folate intake prior to conception and during the early part of pregnancy has been linked with low infant birthweight, stillbirth, neural tube defects (NTDs), such as spina bifida, and congenital heart defects.[40 41 42] The incidence of spina bifida appears to be related to a low folate status and to a genetic predisposition to this disorder. The high prevalence of macrocytic anaemia among Keewatin children is believed to be partly due to a low folate intake by adolescent mothers.[43]

Folate recommendations are designed to meet the need of most healthy individuals. Current recommended levels are 185 mcg per day and increase by 100 mcg per day during lactation and by 200 mcg per day during pregnancy.[3] Folate requirements are doubled during pregnancy because of folate's role in the development of DNA, RNA, synthesis of amino acids, expansion of blood volume and fetal growth. Recent recognition of the critical role played by folate in the normal development of the spinal cord, and of the need for adequate folate stores in the very early stages of pregnancy, has prompted the Canadian Medical Association to recommend folate supplements prior to conception and during the first 10 weeks of pregnancy, especially for women with a poor folate status or a history of NTDs.[44]

Recommendations for folate intake are currently under review by Health Canada. In the United States, the Food and Nutrition Board of the National Academy of Sciences (NAS) has formed a panel with the participation of Canadian scientists, to review the Recommended Dietary Allowances (RDAs) for all essential nutrients in light of the most recent research and to develop Dietary Reference Intakes (DRI) for a number of essential nutrients. The DRIs will update and work towards harmonization of the American RDAs and the Canadian Recommended Nutrient Intakes (RNIs). Based on a review of the literature on the effects of folate on spina bifida, the NAS has recommended an RDA of 400 mcg for all women 14 years of age and over, 600 mcg for pregnant women and 500 mcg for lactating women. The RDA is the intake which meets the daily nutrient requirement of almost all individuals in a specific age and gender group.

In January 1998, the U.S. Food and Drug Administration introduced legislation requiring manufacturers to add folic acid to flour, corn meals, pasta and rice in order to reduce the risk of spina bifida in newborns. Since the end of 1998, Health Canada has also required folic acid supplementation of flour and enriched pasta products (150 mcg per 100 grams of flour). This fortification is expected to increase the general level of folic acid intake by the Canadian population by 50 to 150 mcg per day. The NAS is also recommending that women capable of becoming pregnant take a supplement of 400 mcg of synthetic folic acid daily from fortified foods and/or a supplement in addition to the food folate naturally present in a varied diet in order to reduce the risk of spina bifida.[45]

The current Canadian recommendations for women of childbearing age are to consult a physician about folic acid supplements and to follow Canada's Food Guide to Healthy Eating.[46] Good sources of folate include orange juice, dark green vegetables such as romaine lettuce and broccoli, corn, flour, pasta and breakfast cereals enriched with folate, peas and beans and liver.

This study did not find any significant improvement in folate intake in either community (Table 41, Figure 5). In 1997, mean intake was 104 mcg in Repulse Bay and 123 mcg in Pond Inlet. This represents about half of the RNI in Repulse Bay and two thirds of the RNI in Pond Inlet. In both years, average intakes were significantly higher in Pond Inlet than in Repulse Bay ($p=.01$ in 1992; $p=.10$ in 1997). Mean intakes of 142 mcg and 162 mcg, respectively, were reported for Quebec Inuit women and Nova Scotia women 18 to 34 years of age.[33,36] For pregnant and lactating women, mean intakes were about a third of the recommended level in Repulse Bay and about half of the recommended level in Pond Inlet (based on folate requirements during lactation) (Table 42, Figure 5). This intake would represent only 25% of the RNI for pregnant women in Repulse Bay and 38% of the RNI for pregnant women in Pond Inlet.

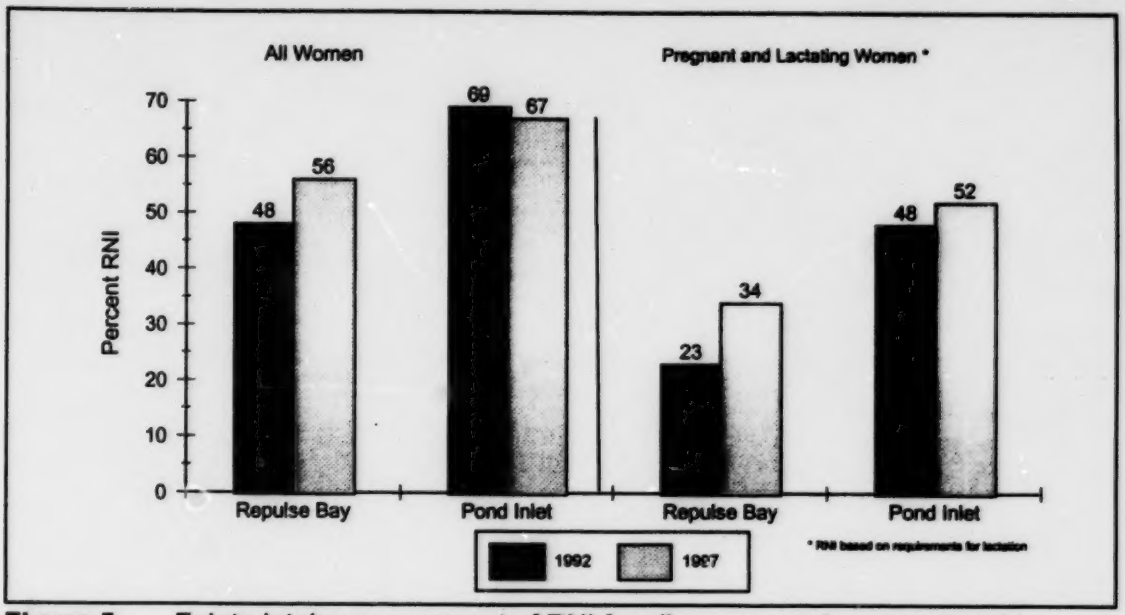

Figure 5. Folate intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997

No significant relationship was found between folate intake and socio-economic status or age in Repulse Bay or Pond Inlet, but there was some evidence that folate intake was positively related to socio-economic status in Pond Inlet (p=.16).

A number of studies have reported low folate intakes among the Inuit[2 33 34] and, in all cases, mean intakes were below those found among women aged 18 to 34 in the Nova Scotia nutrition survey (162 mcg) or the Quebec Health Survey (203 mcg).[36 47] Low median folate intakes have been reported among other groups, such as non-Hispanic Black women over age 16, in the United States. However, the mean folate intake of non-Hispanic Black women aged 20 to 29 was 204 mcg, and of those aged 30 to 39, 192 mcg. Among low-income American adolescents and adults, mean intakes were lower than recommended, but their mean intakes were not more likely to be below RDA values than mean intakes of high-income groups.[48]

Thiamin, riboflavin, niacin, vitamin B_6 and vitamin B_{12}

The other B vitamins are necessary for carbohydrate metabolism and for the health of the nervous system. Deficiencies of these vitamins are rare, but may develop with alcohol and drug abuse. Mean intakes of thiamin, riboflavin, niacin, vitamin B_6 and vitamin B_{12} exceeded the RNI for all women and pregnant and lactating women (Tables 41 and 42).

Calcium

Calcium is essential for the normal development of bones and teeth and helps to regulate a number of important body processes, including nerve transmission, blood clotting, muscle contraction and hormone function. Inadequate calcium intake during puberty may increase the risk of postmenopausal osteoporosis and inadequate intake in later years may increase bone loss.

While it is generally accepted that calcium requirements are higher during puberty, when bone mass is being established, adult requirements are somewhat more controversial. Even the higher requirements traditionally thought necessary during pregnancy and lactation are now being questioned. Calcium intakes vary widely among individuals, ethnic and cultural groups and a deficiency has not been clinically recognized. Calcium absorption is influenced by a number of factors, including physical activity, hormonal influences, protein consumption and the presence of vitamin D.

Given the wide cultural differences in calcium intake, the variability in absorption and the fact that low calcium intakes do not necessarily result in any clinical signs of deficiency, it is very difficult to accurately determine individual requirements. Therefore, the RNI for calcium is not based on a known deficiency level. Instead, it represents "a desirable or suitable intake" based on the *average* intake of a population group (usually the general population). The Canadian recommendations for calcium are currently under review and Health Canada will be examining the new "Adequate Intake" (AI) for calcium now being recommended in the United States by the Food and Nutrition Board of the NAS. The AI for calcium is based on the average group intake that appears to reduce the incidence of bone fractures in senior years by maximizing bone mass during puberty and minimizing bone loss in senior years. The new AIs for calcium are 1300 mg for women 13 to 18 years, 1000 mg for women 19 to 50 and 1200 mg for women over 50. The AIs are not increased during pregnancy and lactation, reflecting new evidence that demonstrates the body has its own self-regulatory mechanisms for protecting the fetus and providing sufficient calcium in breast milk.[49 50]

Most studies have found relatively low calcium intakes among the Inuit, but no evidence of deficiency has been demonstrated to date.[34 51 52] This absence of any signs of calcium deficiency may suggest that the calcium requirement of the Inuit, especially among those consuming mostly traditional foods, may be lower than in the general Canadian population. Or, as some authors suggest, food consumption surveys may underestimate the calcium intake of northern Aboriginal populations, especially the contribution of traditional foods.[53]

Between 1992 and 1997, there was no change in calcium intake in Repulse Bay, but some evidence of a decline in Pond Inlet (p=.07). In 1997, mean calcium intakes were 404 mg in Repulse Bay and 402 mg in Pond Inlet, representing a little more than half of the RNI (Table 43, Figure 6). For pregnant and lactating Inuit women, calcium intakes met only about a third of the RNI for lactation in Repulse Bay and 40% in Pond Inlet (Table 44, Figure 6). There was no relationship between calcium intake and socio-economic status or age in either community.

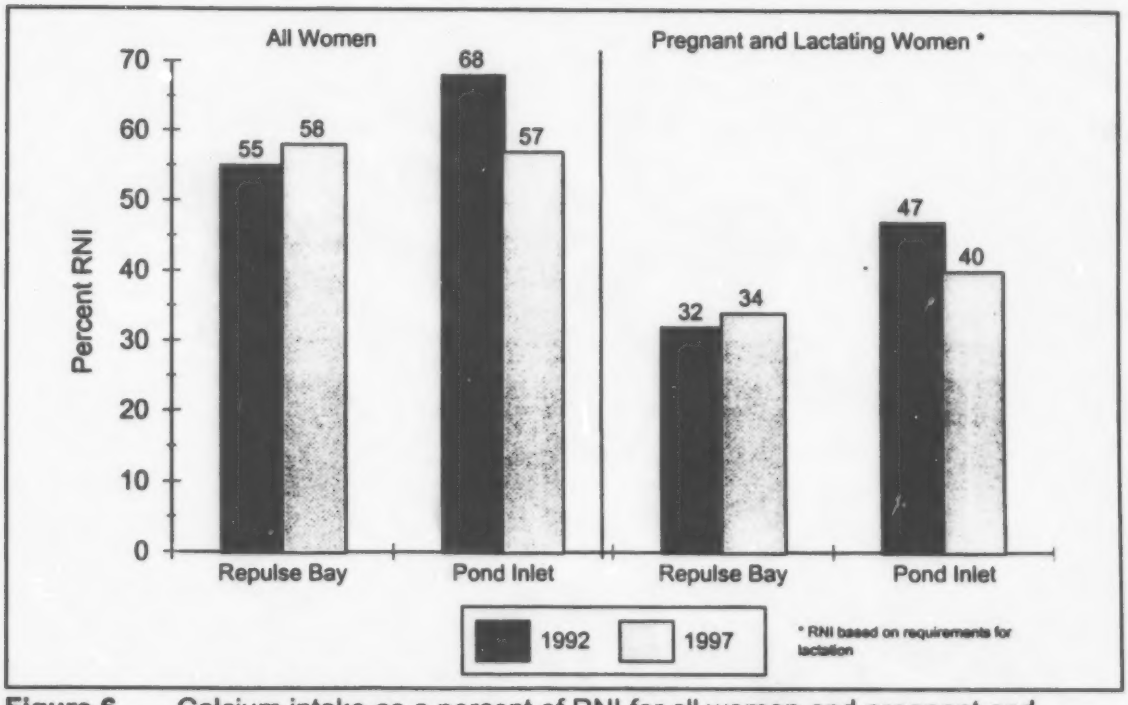

Figure 6. Calcium intake as a percent of RNI for all women and pregnant and lactating women, 1992 and 1997.

Table 43. Mean intake of selected micronutrients, all women aged 15 to 44

Micronutrients	RNI	Repulse Bay		Pond Inlet		
		Mean Intake		Mean Intake		
		1992	1997	1992	1993	1997
Total N		62	71	116	123	136
Calcium (mg)	700	382	404	479	471	402
% RNI		*55*	*58*	*68*	*67*	*57*
Iron (mg)	13	23.6	12.9	27.7	28.1	22.3
% RNI		*181*	*99*	*213*	*216*	*172*
Zinc (mg)	9	16.3	9.8	16.9	15.1	14.4
% RNI		*181*	*109*	*188*	*168*	*160*
Magnesium (mg)	200	240	170	224	223	202
% RNI		*120*	*85*	*112*	*111*	*101*
Phosphorus (mg)	850	1148	1041	1385	1231	1271
% RNI		*135*	*122*	*163*	*145*	*150*
Potassium (mg)		2025	1952	2098	2128	2042
Sodium (mg)		2341	2093	2522	2318	2432
Cholesterol (mg)		291	291	418	310	356
Caffeine (mg)		769	242	325	416	281

Table 44. Mean intake of selected micronutrients, pregnant and lactating women aged 15 to 44

		Repulse Bay		Pond Inlet		
Micronutrients	**RNI***	**Mean Intake**		**Mean Intake**		
		1992	**1997**	**1992**	**1993**	**1997**
Total N		11	18	40	38	41
Calcium (mg)	1200	383	405	565	508	484
% RNI		*32*	*34*	*47*	*42*	*40*
Iron (mg)	13	29.9	14.0	31.4	32.6	22.3
% RNI		*230*	*107*	*241*	*251*	*172*
Zinc (mg)	15	25.4	10.6	16.6	15.0	15.7
% RNI		*169*	*71*	*111*	*100*	*105*
Magnesium (mg)	265	285	171	224	221	233
% RNI		*108*	*64*	*84*	*83*	*88*
Phosphorus (mg)	1050	1339	1026	1502	1294	1573
% RNI		*128*	*98*	*143*	*123*	*150*
Potassium (mg)		2072	2041	2006	1968	2520
Sodium (mg)		2661	1858	2805	2435	2974
Cholesterol (mg)		323	323	445	314	430
Caffeine (mg)		1058	202	246	385	233

* Based on the RNI for lactating women. This would underestimate the requirements for iron during pregnancy.

Iron and zinc

Iron is essential to good health because it helps to transport oxygen from the blood to all tissues in the body. A severe deficiency results in anaemia, causing fatigue, impairing an individual's capacity to learn and work and reducing the ability to resist infection. Inadequate iron stores during pregnancy may make delivery more difficult and reduce oxygen supply to the fetus. Iron-deficiency anaemia is a serious health concern among young pregnant Inuit women in Nunavik.[54]

The recommended intake of iron represents an estimate of the average requirements of a population group with similar characteristics and would meet the needs of most individuals in that group. The RNI for women is 13 mg of iron per day. During pregnancy, the RNI increases to 18 mg in the second trimester and 23 mg during the third trimester.

Mean iron intake was 12.9 mg in Repulse Bay, significantly lower than in Pond Inlet (22.3 mg), and significantly less than in 1992 (Table 44, Figure 7). For Quebec Inuit women aged 18 to 34 and Nova Scotia women, mean intakes were 14.4 mg and 10.7 mg, respectively.[33 36]

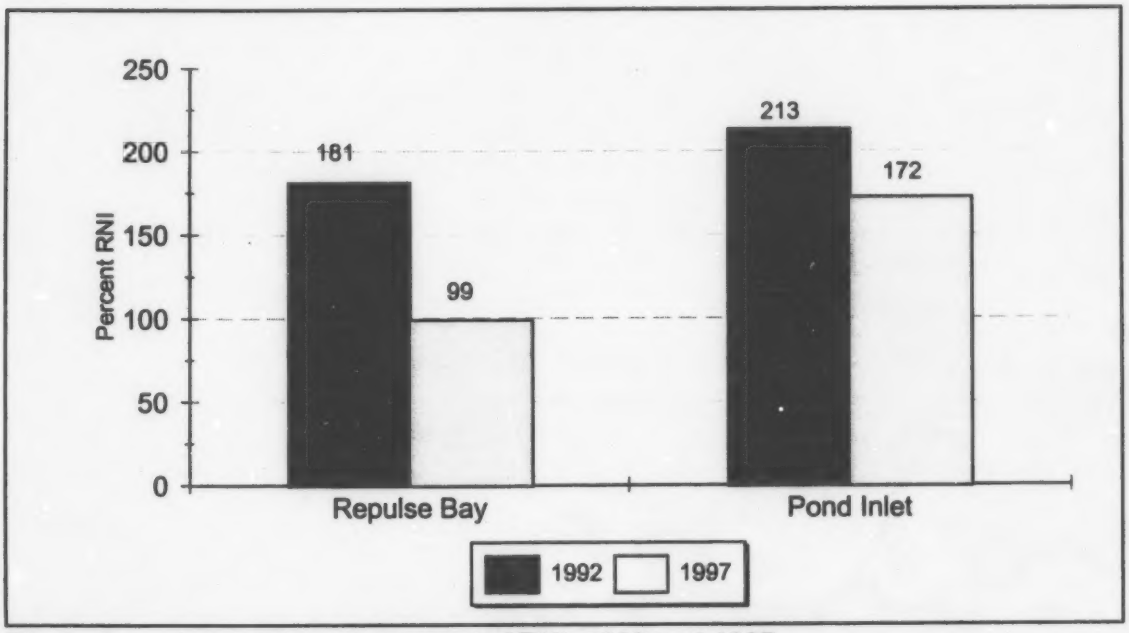

Figure 7. Iron intake as a percent of RNI, 1992 and 1997

In both communities, iron intake increased with age (p=.004 for Pond Inlet and p=.05 for Repulse Bay). In Pond Inlet, iron intake was significantly higher among women 25 years of age and over (p=.04) (Table 45). Mean intake was below the RNI for younger women in Repulse Bay. Although the difference in intake by age was not as obvious in Repulse Bay because of the lower consumption of country food, and especially country meat, birds and fish, younger women also appeared to have a lower iron intake in this community.

Table 45. Mean iron intake (mg) by age group, 1997

Age group	Repulse Bay	Pond Inlet
Women under 25	11.3	14.6
Women 25 years and over	14.1	26.7

Zinc is a component of more than 200 enzymes involved in the metabolism of protein, fat, carbohydrate and nucleic acids, so that it plays a critical role in many body processes, including reproduction, healing, normal growth, vision and appetite. The RNI is 9 mg for women and 15 mg during pregnancy. The absence of seal and polar bear in the diet in Repulse Bay in 1997 resulted in lower mean intakes than in 1992 (10 mg versus 16 mg) (Table 43). For pregnant and lactating women, mean zinc intake was less than three quarters of the recommended level for lactation in Repulse Bay and above the RNI in Pond Inlet (Table 44).

Caffeine and cholesterol

Nutrition Recommendations suggest a limit of 320 mg of caffeine per day (the equivalent of four cups of coffee) and moderation (not more than two cups of coffee per day) during pregnancy. In Repulse Bay, reported caffeine intake was much lower than in 1992 and, in both communities, average caffeine intake was equivalent to about 3 to 3½ cups of coffee a day (Table 43). Among pregnant and lactating women, caffeine intakes were somewhat lower than in the general population (Table 44). Pregnant and lactating women in Repulse Bay appear to have reduced their caffeine intake from over 1000 mg in 1992 to about 200 mg in 1997.

Average intake of dietary cholesterol was similar to 1992. In 1997, mean intakes were close to the recommended maximum of 300 mg per day in Repulse Bay and 430 mg in Pond Inlet (Table 43).

Matched Analysis

Twenty-nine respondents from Repulse Bay and 60 from Pond Inlet in 1997 participated in the 1992 survey, representing less than half of the original sample. Mean energy and nutrient intakes roughly match those of the general population. There did not appear to be any differences in energy or nutrient intake of this sample since 1992.

Energy and Nutrient Contribution by Food Mail Category

Since the objective of the Northern Air Stage Program is to improve health and nutrition in isolated communities, the energy and nutrient contribution of those foods whose transportation costs are currently being subsidized was examined and compared to the contribution of country food and foods excluded from the program. Of the five categories, only foods which qualify as Nutritious Perishables or Non-perishable Foods are subsidized under this program. Although country food is not part of the program, its nutritional and economic importance is recognized by treating it as a separate category.

Country Food

In 1997, country food provided an average of 264 Calories in Repulse Bay (16% of energy) and 534 Calories (26% of energy) in Pond Inlet (Table 46, Figure 8). By comparison, country food supplied 29% of energy in the Broughton Island study.[34] There was no significant difference in the energy contribution of country food between 1992 and 1997 in either community. In both years, the energy obtained from country food was significantly higher in Pond Inlet than in Repulse Bay ($p=.03$ in 1992 and $p=.005$ in 1997). In 1997, women under 25 in Repulse Bay were obtaining only about a quarter as much energy from country food as those between 25 and 44. In Pond Inlet, women under 25 were getting about 40% as much energy from country food as the older group (Table 47). The food frequency questionnaire confirmed these age differences in Pond Inlet, but not in Repulse Bay. No relationship was found between energy from country food and socio-economic status, education, food security, BMI or participation in the hunter support program.

Country foods were the major source of certain other nutrients including protein, iron, zinc, phosphorus, thiamin, riboflavin, niacin, vitamin B_6 and vitamin B_{12} in both communities (Tables C-1 and C-2). In 1997, country food provided 42% to 55% of protein intake (Figure 9). It was an important source of fat (Figure 10) and vitamin A (Figure 11), especially in Pond Inlet, and the major source of iron (Figure 12). In 1997, country food supplied significantly less iron to the diet of women in Repulse Bay than in 1992 ($p=.02$), and significantly less iron than in Pond Inlet ($p=.02$). This was not due to a lower consumption of country food but, as Table 48 indicates, to a different mix of country food in the two survey years, notably, less seal and polar bear, and more Arctic char.

Table 46. Mean daily amount of energy and selected nutrients obtained from country food: 24-hour recall

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Amount (g)	203	139	266	215	229
Calories	352	264	588	411	534
Protein (g)	63	35	80	61	65
Fat (g)	9	13	27	17	28
Saturated fat (g)	2.2	2.0	5.4	3.5	5.9
Cholesterol (mg)	163	112	235	179	192
Calcium (mg)	25	20	33	32	31
Phosphorus (mg)	502	317	657	523	565
Iron (mg)	15.7	5.3	19.2	18.7	14.4
Zinc (mg)	10.3	4.3	10.0	8.5	7.2
Vitamin A (RE)	15	106	261	233	242
Vitamin C (mg)	6	1	4	2	3
Thiamin (mg)	0.45	0.38	0.57	0.51	0.51
Riboflavin (mg)	1.24	0.83	1.42	1.42	1.24
Niacin (NE)	22.5	16.2	28.3	23.8	25.6
Vitamin B_6 (mg)	0.43	0.42	0.54	0.52	0.52
Folate (mcg)	10	9	11	9	11
Vitamin B_{12} (mcg)	9.2	8.6	12.7	11.2	10.9

Table 47. Mean daily amount of energy (Calories) obtained from country food by age group, 1997

Age group	Repulse Bay	Pond Inlet
Under 25	95	253
25 years and over	387	692
	p=.02	p=.001

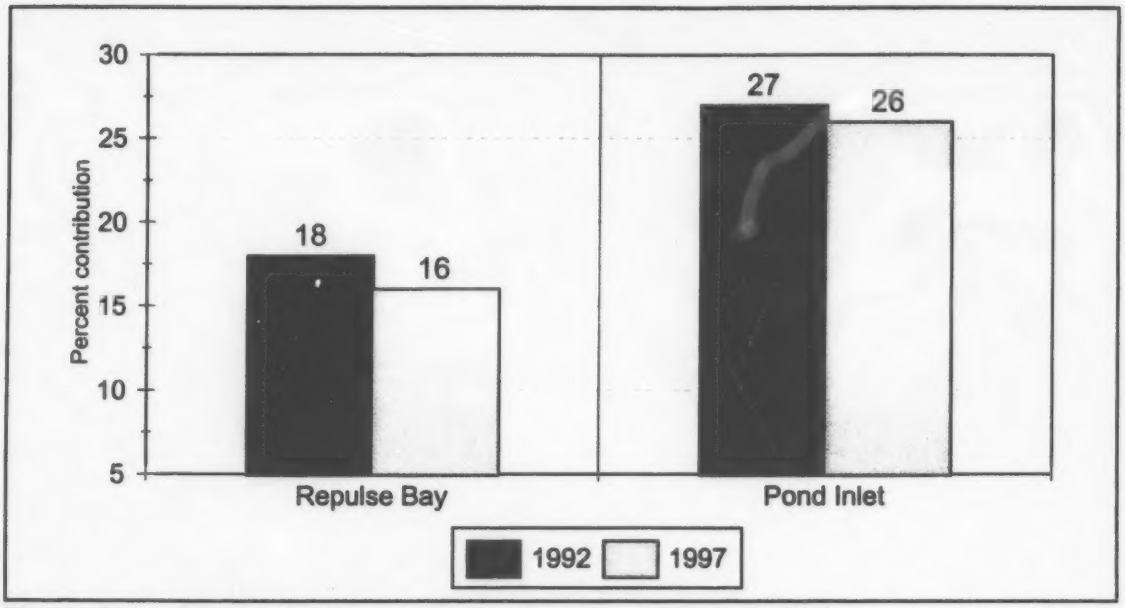

Figure 8. Country food as a source of energy, 1992 and 1997

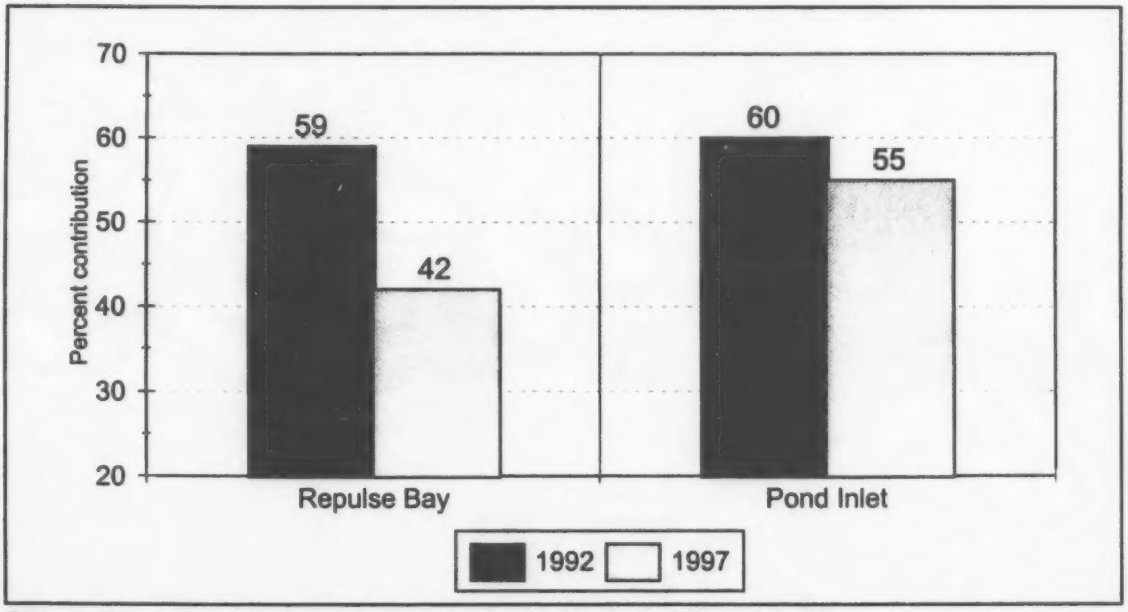

Figure 9. Country food as a source of protein, 1992 and 1997

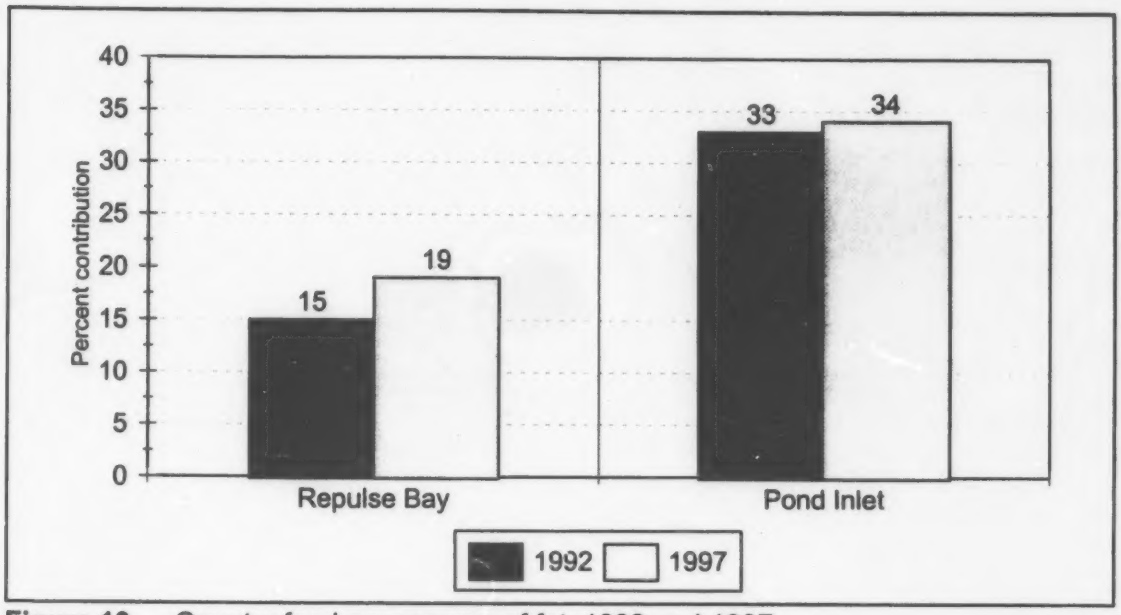

Figure 10. Country food as a source of fat, 1992 and 1997

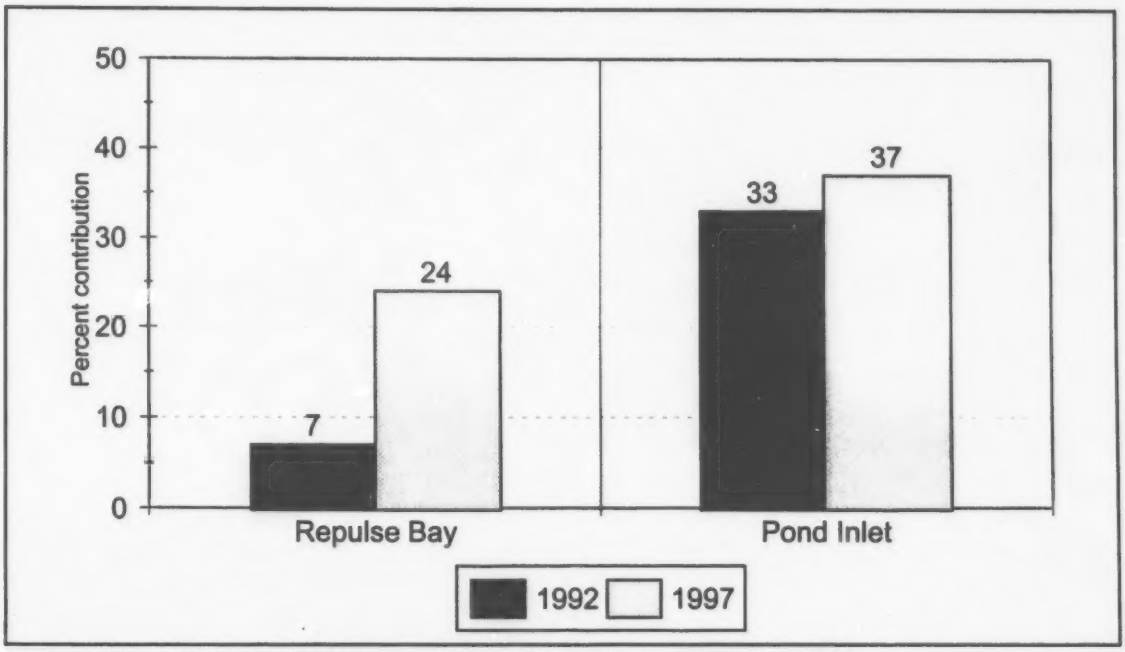

Figure 11. Country food as a source of vitamin A, 1992 and 1997

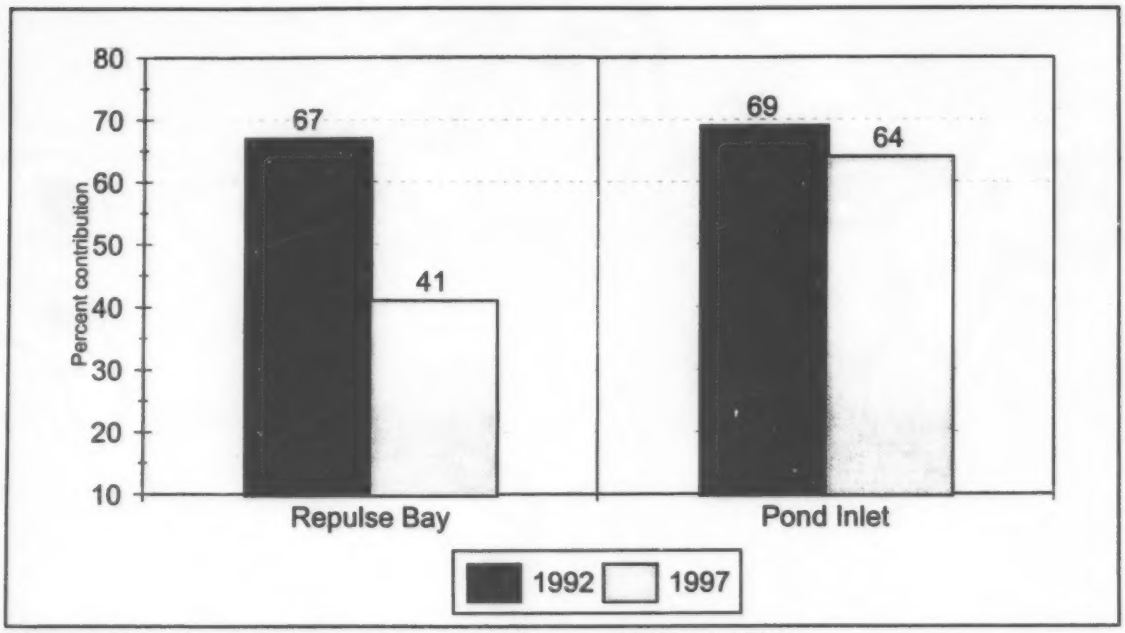

Figure 12. Country food as a source of iron, 1992 and 1997

Table 48. Contribution of country foods to mean iron intake, Repulse Bay

	Mean iron intake (mg)	
	1992	1997
Arctic char	0.1	0.1
Caribou	6.8	5.1
Polar bear	2.9	
Seal	5.9	
Total (all country food)	15.7	5.3

It is important to note that country food was not an important source of calcium, fibre, sodium, vitamin C and folate and not as important a source of energy, fat, saturated fat and vitamin A as store foods (Tables C-1 and C-2).

Nutritious Perishable Foods

In 1997, the average amount of Nutritious Perishable Foods consumed in Pond Inlet was 306 grams per day, compared to 215 grams per day in Repulse Bay. Fruit and vegetable consumption accounted for most of the difference (Table 49).

Table 49. Weight of Nutritious Perishable Foods consumed by food group, 1997

Food group	Repulse Bay		Pond Inlet	
	Weight (grams)	Percent of total	Weight (grams)	Percent of total
Dairy Products	33	15%	42	14%
Meat, Poultry, Fish	45	21%	47	15%
Eggs and Meat Alternatives	13	6%	8	3%
Cereal Products	16	7%	28	9%
Fruit	19	9%	70	23%
Vegetables	24	11%	56	18%
Fats and Oils	2	1%	5	2%
Miscellaneous (e.g., frozen pizza)	63	29%	50	16%
Total (per person per day)	215	100%	306	100%

In 1997, Nutritious Perishable Foods contributed an average of 426 Calories in Repulse Bay and 523 Calories in Pond Inlet (Table 50), representing 25% and 26% of energy intake in Repulse Bay and Pond Inlet, respectively (Tables C-1 and C-2). There was no statistically significant change in the mean energy obtained from these foods between 1992 and 1997 in either community. Although there was a 20% increase in the mean amount of, and energy obtained from, Nutritious Perishables in Repulse Bay, these increases were not statistically significant. However, the percentage of energy obtained from these foods in Repulse Bay had increased from 18% to 25% over this period.

Table 50. Mean daily amount of energy and selected nutrients obtained from Nutritious Perishable Food

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Amount* (g)	178	215	297	199	306
Calories	355	426	505	326	523
Carbohydrate (g)	26	34	43	30	50
Protein (g)	20	24	28	17	25
Fat (g)	19	21	24	16	25
Saturated fat (g)	7.3	8.5	9.5	6.5	10.0
Cholesterol (mg)	75	123	127	74	94
Fibre (g)	1.7	2.0	3.2	2.0	3.7
Calcium (mg)	100	177	185	163	197
Iron (mg)	2.1	2.4	3.0	1.9	3.1
Sodium (mg)	379	620	488	424	678
Vitamin A (RE)	121	206	273	158	280
Vitamin C (mg)	8	10	26	15	30
Thiamin (mg)	0.23	0.30	0.41	0.20	0.37
Riboflavin (mg)	0.30	0.41	0.47	0.32	0.44
Niacin (NE)	8.0	9.9	11.2	6.4	10.1
Vitamin B_6 (mg)	0.32	0.37	0.46	0.27	0.42
Folate (mcg)	27	39	55	35	61
Vitamin B_{12} (mcg)	1.1	1.1	1.3	0.8	1.2

* Amount includes water added to frozen fruit juice concentrate.

In Repulse Bay, there was a significant increase in the mean calcium intake from Nutritious Perishables (p=.03), primarily from the increase in pizza consumption. There was also some evidence of an increase in the amount of vitamin A obtained from these foods in Repulse Bay, from 121 RE in 1992 to 206 RE in 1997 (p=.11).

In Pond Inlet, these foods contributed one and a half times as much folate as in Repulse Bay (p=.01) and three times as much vitamin C. Figures 13 to 15 illustrate the contribution of Nutritious Perishable Foods to vitamin A, folate and calcium in each community for 1992 and 1997. Nutritious Perishables were the major source of folate, vitamin A, calcium, and saturated fat in both communities. The *percentage* of vitamin A coming from Nutritious Perishables declined in Repulse Bay, although the mean *amount* of vitamin A coming from these foods had increased. In Repulse Bay, Nutritious Perishables were also the major source of fat and cholesterol and an important source of fibre, vitamin B_6 and sodium (Table C-1). In Pond Inlet, Nutritious Perishables were also the major source of fibre, vitamin C and potassium as well as an important source of fat and vitamin B_6 (Table C-2).

Nutritious Perishables supplied more of most nutrients in Pond Inlet than in Repulse Bay. However, there was more evidence of an increase in the relative importance of these foods in Repulse Bay than in Pond Inlet over this period.

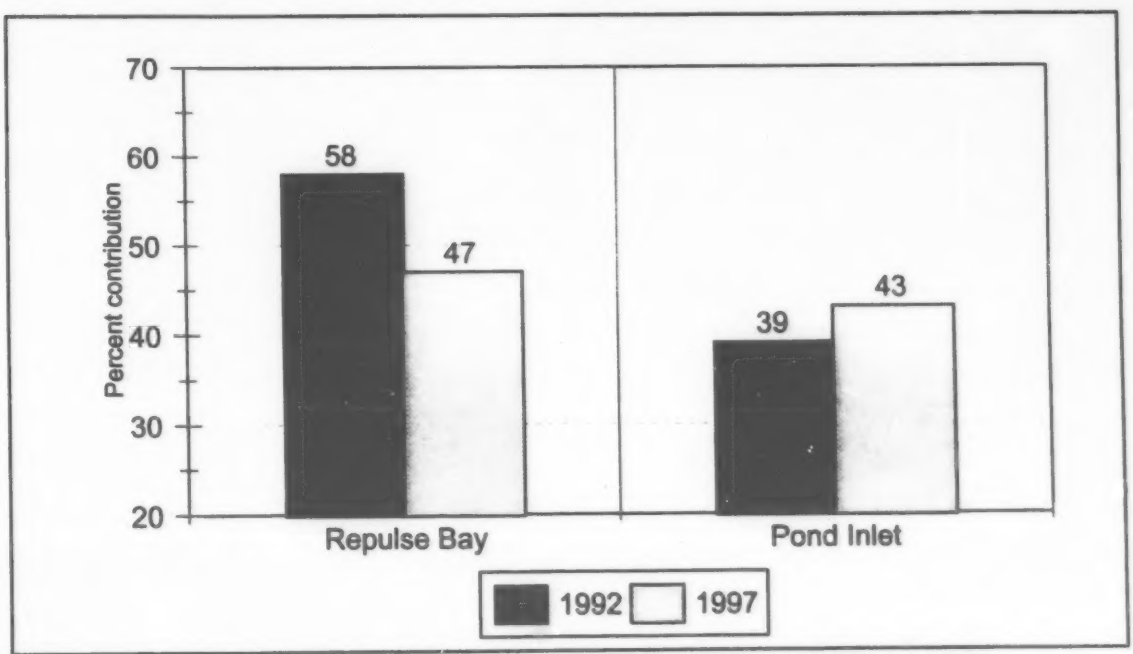

Figure 13. Nutritious Perishables as a source of vitamin A, 1992 and 1997

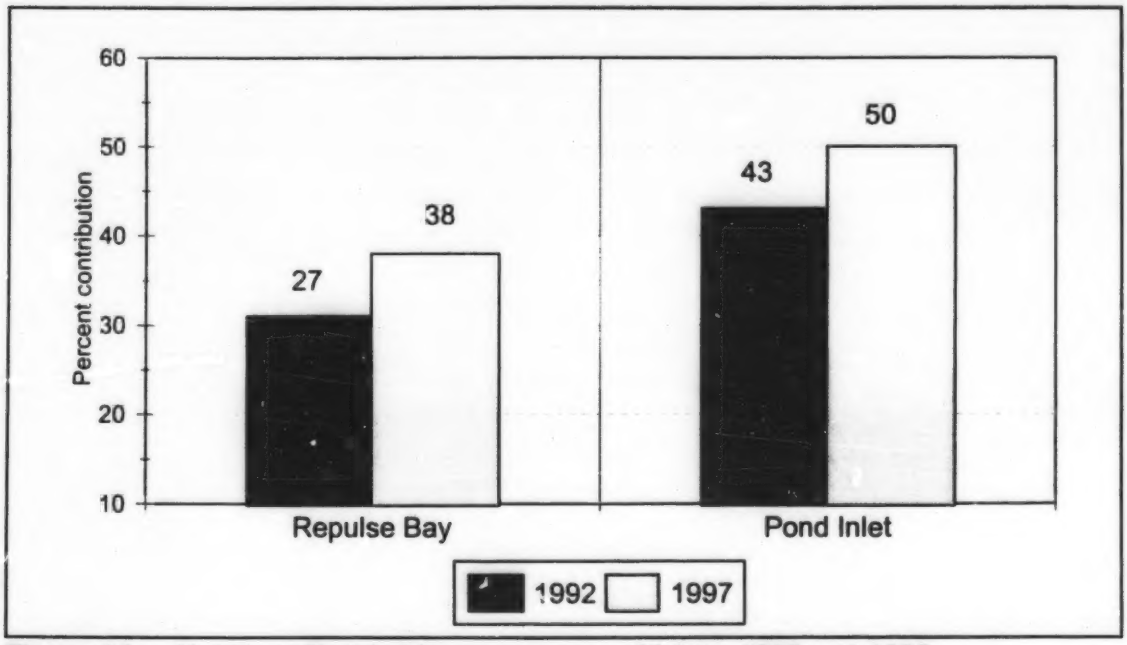

Figure 14. Nutritious Perishables as a source of folate, 1992 and 1997

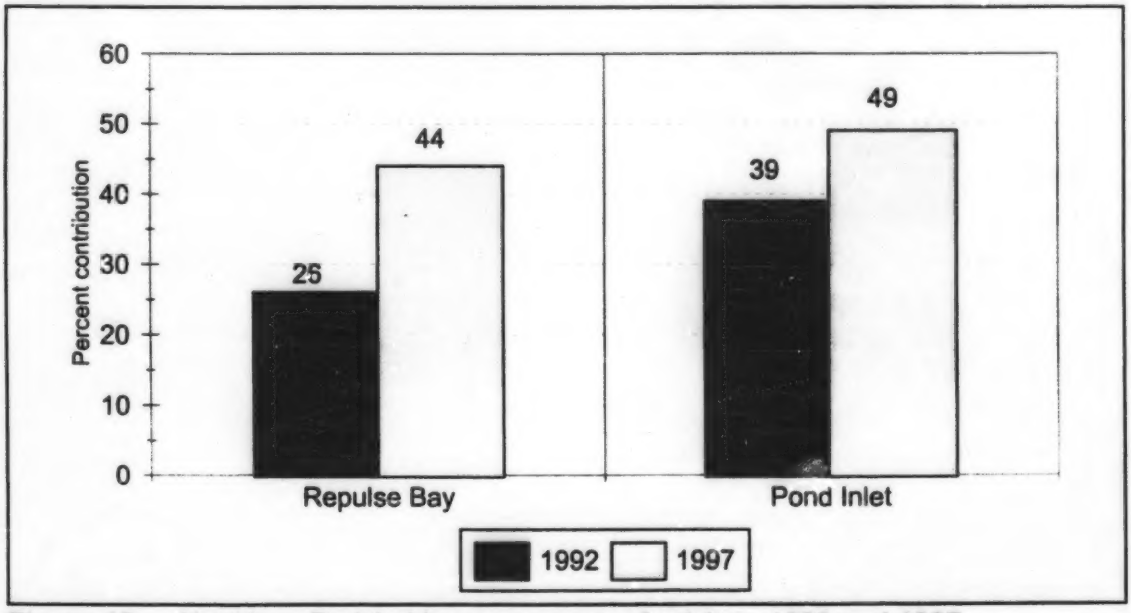

Figure 15. Nutritious Perishables as a source of calcium, 1992 and 1997

Non-perishable Foods

In 1997, Non-perishables provided an average of 491 Calories in Repulse Bay and 449 Calories in Pond Inlet (Table 51). In both communities, the mean energy intake from Non-perishables was significantly lower in 1997 than in 1992 (p=.001).

In Repulse Bay, Non-perishables continued to be the most important source of energy (29%), although they provided significantly less energy than in 1992 (42%). They were also the most important source of carbohydrate (44%) (Figure 16), fibre (40%), magnesium (35%), sodium (43%), vitamin C (62%) and caffeine (91%) to women in Repulse Bay (Table C-1). In Pond Inlet, Non-perishables were a less important source of energy than in 1992 (22% versus 30%) and carbohydrate (39% versus 52% in 1992) (Figure 17). They were also the most important source of magnesium (31%), sodium (48%) and caffeine (90%) in Pond Inlet (Table C-2).

Table 51. Mean daily amount of energy and selected nutrients obtained from Non-perishable Foods

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Amount* (g)	2009	914	1347	1713	1016
Calories	819	491	649	865	449
Carbohydrate (g)	151	84	114	150	78
Protein (g)	16	12	14	18	12
Fat (g)	17	12	16	22	10
Saturated fat (g)	6.2	4.3	5.6	6.6	3.3
Cholesterol (mg)	34	21	22	25	18
Fibre (g)	2.9	2.4	3.0	4.3	2.3
Calcium (mg)	173	133	201	206	106
Iron (mg)	4.3	3.5	4.1	5.9	3.2
Sodium (mg)	1452	904	1568	1315	1174
Vitamin A (RE)	48	91	144	84	105
Vitamin C (mg)	32	46	48	31	23
Thiamin (mg)	0.43	0.34	0.39	0.60	0.31
Riboflavin (mg)	0.43	0.33	0.48	0.57	0.31
Niacin (NE)	9.6	7.0	7.4	9.4	6.4
Vitamin B_6 (mg)	0.18	0.18	0.20	0.19	0.20
Folate (mcg)	37	33	46	68	35
Vitamin B_{12} (mcg)	0.3	0.4	0.4	0.6	0.5

* Amount includes water as a beverage and water added to tea, coffee, fruit drink crystals with vitamin C and frozen fruit drink concentrate.

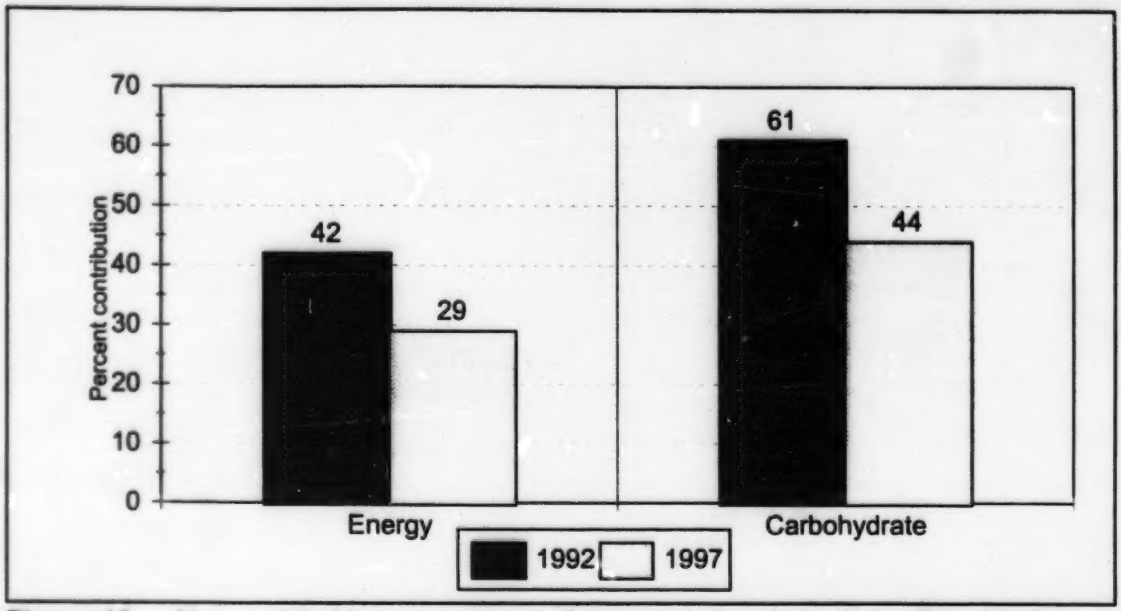

Figure 16. Non-perishables as a source of energy and carbohydrate, Repulse Bay

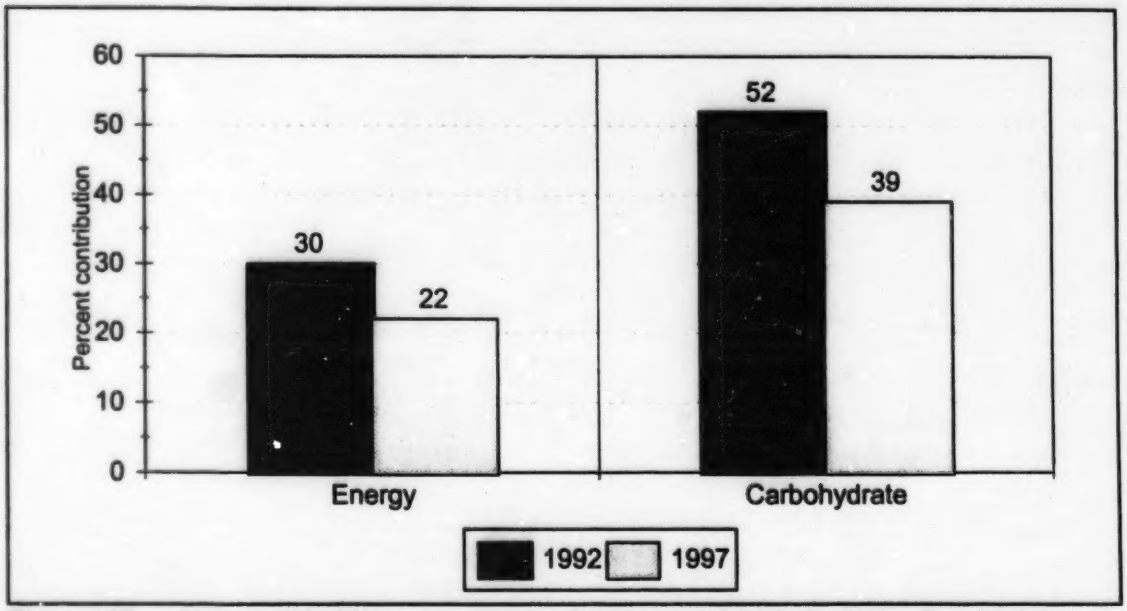

Figure 17. Non-perishables as a source of energy and carbohydrate, Pond Inlet

Foods of Little Nutritional Value

The LNV category includes prepared sweet bakery products, frozen waffles and granola bars; sweets (soft drinks, fruit drink crystals and fruit drinks without vitamin C, chocolate bars, candy and coffee whitener); potato chips; and other high-fat snacks, packaged sandwiches and burgers (Appendix B). Packaged sandwiches and burgers are not necessarily less nutritious than similar products prepared at home. However, they were excluded from the program in 1991, along with other LNV foods, since it was not considered appropriate to promote these convenience foods when the ingredients required to prepare these products are available and eligible for the program. For consistency, these foods have been left in the LNV category in this report, rather than being reclassified as Convenience Perishable Food.

Between 1992 and 1997 there was no significant change in the energy intake from Foods of Little Nutritional Value, nor was there any significant difference between the communities in this respect (Table 52). These foods continued to be an important source of energy (26% in Repulse Bay and 19% in Pond Inlet) (Tables C-1 and C-2 , Figure 18). They contributed over a third of carbohydrate intake in both communities. LNV foods also provided about 20 to 25% of fat, saturated fat, fibre, sodium, magnesium, potassium and vitamin C in Repulse Bay.

Within the LNV category, sweets (mainly soft drinks and fruit drink crystals) were the most important source of calories and carbohydrate, supplying 12% of calories and about 25% of carbohydrate in both communities. In Repulse Bay, potato chips supplied 15% of total fat intake, compared to 5% in Pond Inlet. However, as noted earlier, the food frequency questionnaire suggests a much higher consumption of both pop and potato chips than the 24-hour recall, and similar consumption levels in the two communities.

In 1997, there was no significant relationship between the energy obtained from LNV foods and socio-economic status, food security or BMI in either community. Neither age nor education was related to the consumption of these foods in Repulse Bay, but both age and education were found to be related to their consumption in Pond Inlet. On the 24-hour recall, women under 25 in Pond Inlet obtained an average of 582 Calories from LNV foods, twice as much as women between 25 and 44 ($p<.001$). A similar relationship was found on the food frequency questionnaire. In addition, women in Pond Inlet with some high school education or who had completed high school reported higher levels of consumption of LNV foods than those who had not attended high school or those with some post-secondary education ($p=.01$).

Table 52. Mean daily amount of energy and selected nutrients obtained from Foods of Little Nutritional Value

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Amount* (g)	437	451	415	495	462
Calories	426	439	353	451	391
Carbohydrate (g)	69	70	62	78	67
Protein (g)	6	5	3	4	4
Fat (g)	15	15	11	14	11
Saturated fat (g)	6.5	3.7	3.5	3.9	4.0
Cholesterol (mg)	13	13	6	12	14
Fibre (g)	1.0	1.5	1.0	1.4	1.0
Calcium (mg)	83	68	52	64	59
Iron (mg)	1.4	1.3	0.9	1.3	1.1
Sodium (mg)	366	377	198	314	244
Vitamin A (RE)	14	17	11	20	15
Vitamin C (mg)	6	16	7	11	7
Thiamin (mg)	0.10	0.10	0.05	0.07	0.09
Niacin (NE)	2.6	3.0	1.2	2.2	1.6
Vitamin B_6 (mg)	0.08	0.12	0.09	0.13	0.09
Folate (mcg)	15	20	12	21	13
Vitamin B_{12}	0.3	0.2	0.0	0.1	0.1

* Amount includes water added to fruit drink crystals without vitamin C.

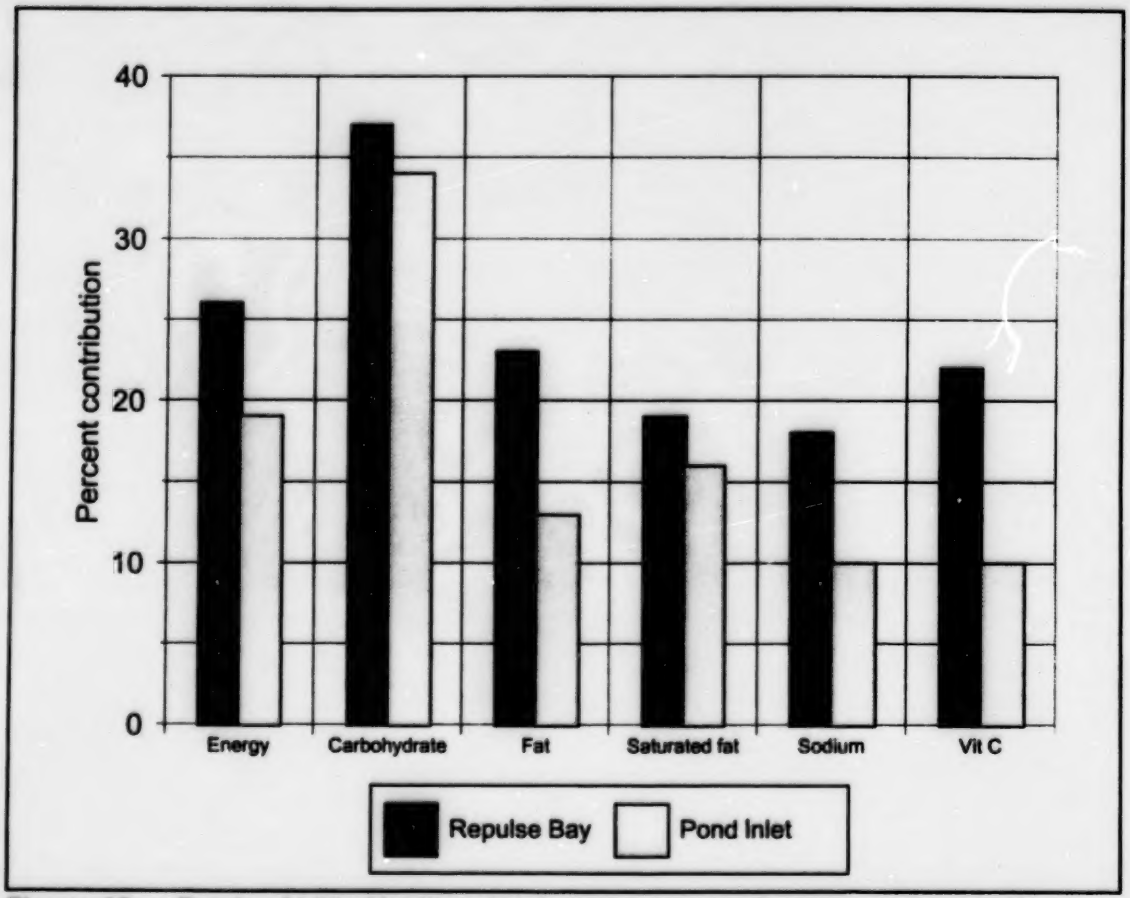

Figure 18. Foods of Little Nutritional Value as a source of energy and nutrients, Repulse Bay and Pond Inlet, 1997

Convenience Perishables

The Convenience Perishable category includes mainly frozen breaded fried chicken, but also other frozen fried prepared foods such as fish in a batter and frozen dinners containing these foods. Convenience Perishables were not a major source of energy or essential nutrients in either community (Table 53). However, considering that this category is mainly fried chicken, it is noteworthy that in Pond Inlet, this category supplied as much energy in 1997 as all other store meats, poultry and fish combined (about 140 Calories, or 7% of energy). Convenience Perishables also provided about 10% of fat, 9% of saturated fat and 8% of sodium in Pond Inlet (Table C-2).

Although the mean energy intake from these foods appeared to have increased in both communities, this change was not statistically significant.

Table 53. Mean daily amount of energy and selected nutrients obtained from Convenience Perishables

	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Amount (g)	8	29	33	30	51
Calories	20	77	86	71	139
Carbohydrate (g)	1	2	2	3	4
Protein (g)	2	7	9	6	12
Fat (g)	1	4	5	4	8
Saturated fat (g)	0.4	1.2	1.5	1.1	2.4
Cholesterol (mg)	5	21	28	19	38
Calcium (mg)	2	6	7	7	11
Iron (mg)	0.1	0.4	0.5	0.4	0.7
Sodium (mg)	24	116	128	121	201
Vitamin A (RE)	11	21	8	9	16
Niacin (NE)	0.5	2.2	2.6	2.2	3.8
Vitamin B_6 (mg)	0.02	0.10	0.12	0.10	0.18
Folate (mcg)	1	2	2	2	3
Vitamin B_{12} (mcg)	0.0	0.1	0.1	0.1	0.2

Sources of Energy and Nutrients by Food Group

Energy

Between 1992 and 1997, there was little change in the energy obtained from most food groups, exception for Miscellaneous perishable foods, non-perishable Cereal Products, non-perishable Fats and Oils and Sugar and Sweets (Table 54). The energy obtained from Miscellaneous perishable foods (mainly pizza) was significantly higher in both communities than in 1992 ($p=.03$ for Pond Inlet, $p=.002$ for Repulse Bay). At the same time, there was a decline in the consumption of non-perishable Cereal Products (mainly flour and pasta) in Pond Inlet ($p=.07$) and Repulse Bay ($p=.04$), as well as a decline in the consumption of non-perishable Fats and Oils (mainly lard) in Pond Inlet ($p=.008$) and evidence of a decline in Repulse Bay ($p=.12$). These changes suggest the replacement of traditional bannock with pizza.

Dairy Products continued to provide only about 3 to 4% of energy, with perishable Dairy Products a more important source of energy than non-perishable. Store Meat, Poultry and Fish provided 12% of calories in Repulse Bay and 13% in Pond Inlet. Again, perishable meats, poultry and fish were a more important source of energy than non-perishable. Cereal Products supplied about 12% of energy. The most important sources of energy within this group were non-perishable foods such as flour and pasta. Although there was a drop in the consumption of non-perishable Cereal Products between 1992 and 1997, there was little change in the consumption of perishable products such as bread. Very little whole grain bread or cereals was reported.

In 1997, fruits and vegetables provided only 4% of calories in Repulse Bay, and 7% in Pond Inlet. There was no significant change in the energy intake from fruits and vegetables between 1992 and 1997. In both communities, perishable fruits and vegetables were more popular than non-perishable. Consumption of perishable fruits and vegetables (particularly Citrus and Tomatoes and Other Vegetables) was significantly higher in Pond Inlet than in Repulse Bay. French fried potatoes provided most of the energy obtained from potatoes in Pond Inlet, while fresh potatoes were a more important source of energy in Repulse Bay.

Sugar and Sweets (excluding those in the LNV category) became a less important source of energy in 1997 ($p<.01$ in Repulse Bay, $p=.01$ in Pond Inlet), contributing only about 5% of energy intake. Store Fats and Oils provided 3 to 4% of energy intake. In 1992, all Miscellaneous foods provided 9% of energy in both communities. By 1997, their contribution to energy had increased to 15% in Repulse Bay and 11% in Pond Inlet.

Table 54. Mean energy intake (Calories per day) from food groups and Food Mail categories

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Dairy Products	Perishable	38	44	57	48	52
	Non-perishable	9	12	22	14	7
Eggs	Perishable	7	21	20	11	12
Meat, Poultry, Fish	Nutritious Perishable	145	124	174	78	130
	Convenience Perishable	13	65	79	46	130
	Non-perishable	19	20	4	22	13
	Country	352	219	584	401	518
Alternates	Perishable	31		17	10	6
	Non-perishable		1	1	2	
Cereal Products	Perishable	53	46	72	42	76
	Non-perishable	257	162	215	376	152
Fruits, vegetables	Perishable	41	41	85	45	107
	Non-perishable	10	23	28	20	32
Fats, Oils	Perishable	21	18	21	19	27
	Non-perishable	87	49	84	129	43
	Country		45	4	10	16
Sugar, Sweets	Non-perishable	280	108	175	176	93
Miscellaneous	Nutritious Perishable	28	131	59	74	114
	Convenience Perishable	7	12	7	25	9
	Non-perishable	149	117	121	126	109
Foods of Little Nutritional Value		426	439	353	451	391
Total		1972	1696	2180	2125	2037

Fat and saturated fat

Country food (mainly muktuk) continued to be the largest source of fat in Pond Inlet (34%). Country food provided only 20% of fat than in Repulse Bay, where LNV foods remained the most important source of fat (23%). In both communities, store Meat, Poultry, and Fish (mainly chicken and ground beef) provided about 20% of fat and store Fats and Oils (mainly lard) about 10% (Table 55). Miscellaneous perishables (pizza) provided 9% and 7% of total fat in Repulse Bay and Pond Inlet, respectively.

In 1997, the most important sources of saturated fat in Repulse Bay were store Meat, Poultry and Fish (23%), LNV foods (19%), store Fats and Oils (14%) and Miscellaneous perishables (pizza) (12%). For Pond Inlet, major sources were country food (23%), store Meat, Poultry and Fish (22%), LNV foods (16%) and store Fats and Oils (11%) (Table 56).

Table 55. Mean fat intake (grams per day) from major sources

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Dairy Products		3	3	4	3	3
Meat, Poultry, Fish	Nutritious Perishable	9	8	11	5	9
	Convenience Perishable	1	4	4	2	8
	Non-perishable	2	2	-	2	1
	Country	9	8	27	16	27
Fats, Oils	Perishable	2	2	2	2	3
	Non-perishable	10	5	9	14	5
	Country		5	-	1	2
Miscellaneous	Nutritious Perishable	1	6	3	3	6
	Convenience Perishable	-	1	-	1	-
	Non-perishable	3	3	3	2	2
Foods of Little Nutritional Value		15	15	11	14	11
Total (all sources)		61	66	83	72	83

Note: "-" indicates a mean intake of less than 0.5 grams

Table 56. Mean saturated fat intake (grams per day) from major sources

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Dairy Products		1.8	1.9	2.6	2.0	1.9
Meat, Poultry, Fish	Nutritious Perishable	3.4	2.8	4.1	2.0	3.2
	Convenience Perishable	0.2	1.1	1.3	0.7	2.3
	Non-perishable	0.6	0.6	0.1	0.6	0.2
	Country	2.2	2.0	5.3	3.5	5.4
Fats, Oils	Perishable	0.9	0.8	1.0	1.0	1.1
	Non-perishable	3.9	2.0	3.4	4.1	1.6
	Country			0.1		0.5
Miscellaneous	Nutritious Perishable	0.5	2.4	1.2	1.3	2.2
	Convenience Perishable	0.2	0.1	0.2	0.4	0.1
	Non-perishable	1.0	1.0	0.9	0.9	0.8
Foods of Little Nutritional Value		6.5	3.7	3.5	3.9	4.0
Total (all sources)		22.6	19.8	25.5	21.6	25.5

Vitamin A

In 1997, the major sources of vitamin A were country food (24% in Repulse Bay and 37% in Pond Inlet) and vegetables (21% in Repulse Bay and 26% in Pond Inlet) (Table 57). The most important country food source was walrus fat in Repulse Bay and muktuk in Pond Inlet. Fresh carrots and frozen mixed vegetables were the most important vegetable sources. Miscellaneous non-perishable foods (canned beef stew) were the third most important source of vitamin A.

Although the mean intake of vitamin A in Repulse Bay was significantly higher in 1997, no single food group was responsible for the change.

Table 57. Mean Vitamin A intake (RE per day) from major sources

Food group/Food Mail category	Repulse Bay		Pond Inlet		
	1992	1997	1992	1993	1997
Nutritious Perishable	121	206	273	158	280
Dairy Products	25	28	39	33	33
Eggs	9	26	26	14	15
Vegetables	43	88	153	63	159
Fats and Oils	16	12	23	21	22
Miscellaneous	17	38	18	19	34
Non-perishable	48	91	144	84	105
Vegetables	-	3	37	24	13
Miscellaneous	38	77	79	40	66
Country food	15	106	261	233	242
Total (all sources)	208	441	697	504	659

Note: "-" indicates a mean intake of less than 0.5 RE

Vitamin C

Sugar and Sweets (fruit drink crystals with added vitamin C) and LNV foods (potato chips) were the most important sources of vitamin C for women in Repulse Bay, contributing almost three quarters of total intake. In Pond Inlet, these foods were a much less important source of vitamin C (27%, versus 52% in 1992). Instead, Citrus Fruit and Tomatoes were the most important source (37%) in Pond Inlet in 1997, if the 24-hour recall provided complete and accurate information about the consumption of potato chips and fruit drink crystals.

Folate

Miscellaneous foods were the largest source of folate in Repulse Bay (32%), while fruit and vegetables were the largest source in Pond Inlet (30%) (Table 58). Fruits and vegetables provided only 12% of folate in Repulse Bay. Compared to 1992, women in both communities obtained more folate from Miscellaneous perishables (mainly pizza)

(p=.04 in Pond Inlet, p=.003 in Repulse Bay) and less from Miscellaneous non-perishables (mostly tea) in 1997. Women in Pond Inlet obtained more than four times as much folate from perishable fruits and vegetables as women in Repulse Bay, particularly from Citrus and Tomatoes (p=.002) and Other Vegetables (p=.005) (Figure 19).

Table 58. Mean folate intake (mcg per day) from major sources

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Dairy Products		2	3	4	3	3
Fruits, vegetables	Perishable	7	7	25	11	29
	Non-perishable	2	6	7	8	8
Citrus, Tomatoes	Perishable	1	1	15	3	11
	Non-perishable	-	2	3	4	5
Other Fruit	Perishable	2	1	2	2	3
	Non-perishable	0	-	-	0	0
Potatoes	Perishable	2	2	3	1	4
	Non-perishable	1	-	-	-	1
Other Vegetables	Perishable	3	2	5	5	10
	Non-perishable	1	4	4	4	2
Cereal Products	Perishable	7	6	9	5	10
	Non-perishable	12	9	10	17	8
Miscellaneous	Nutritious Perishable	3	17	6	9	12
	Convenience Perishable	-	1	-	1	-
	Non-perishable	23	15	27	42	18
Foods of Little Nutritional Value		15	20	12	21	13
Country food		10	9	11	9	11
Total (all sources)		90	104	127	135	123

Note: "-" indicates a mean intake of less than 0.5 micrograms

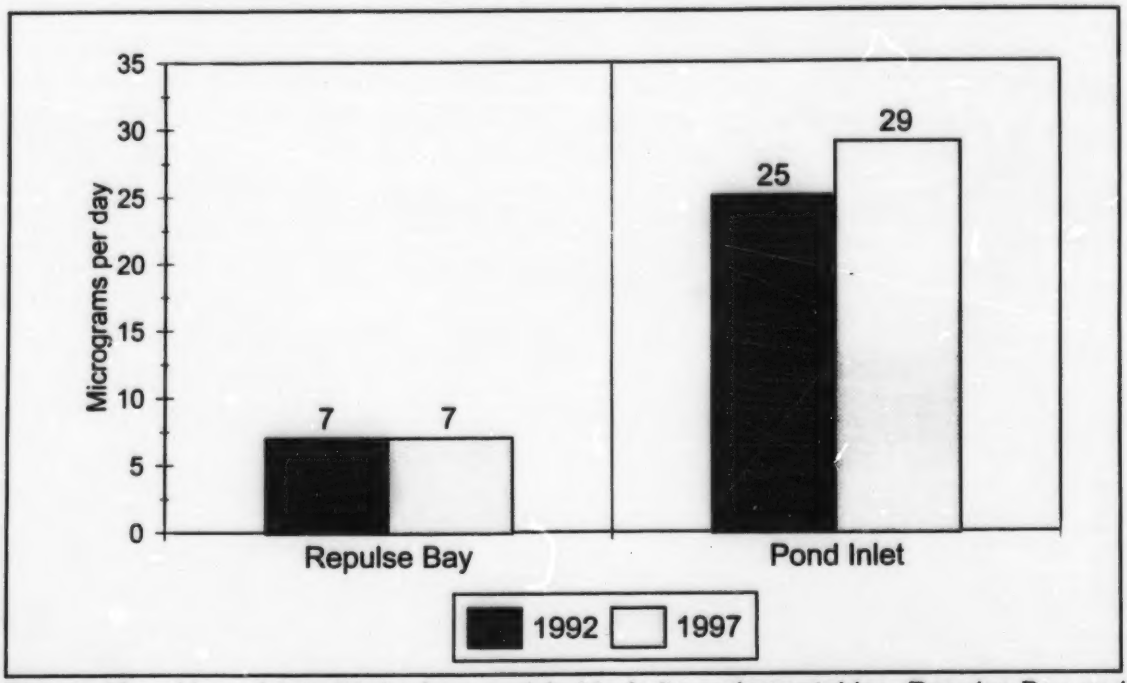

Figure 19. Mean folate intake from perishable fruits and vegetables, Repulse Bay and Pond Inlet, 1992 and 1997

In Pond Inlet, mean folate intake from perishable fruits and vegetables in 1997 was significantly higher among women in relatively well-off families (64 mcg) than among women from working poor families (31 mcg) or those on social assistance (13 mcg) (p=.003). There was no relationship between folate intake from these foods and socio-economic status in Repulse Bay.

Calcium

Miscellaneous foods (mainly pizza and baking powder) were the most important source of calcium in both years, contributing approximately one third of calcium intake (Table 59). Between 1992 and 1997, the amount of calcium obtained from Miscellaneous perishable foods (mainly pizza) in Repulse Bay increased (p=.004). Dairy Products provided only about 20% of calcium, with perishable Dairy Products a more important source than non-perishable. LNV foods (mainly fruit drink crystals without vitamin C and chocolate bars) contributed about 15% of calcium in both communities. The apparent decline in mean calcium intake in Pond Inlet between 1992 and 1997 reflects

the lower consumption of non-perishable Dairy Products (evaporated milk), Sweets (fruit drink crystals with vitamin C added) and Miscellaneous non-perishables (baking powder).

Table 59. Mean calcium intake (mg per day) from major sources

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Dairy Products*	Perishable	45	62	85	83	79
	Non-perishable	17	23	41	27	14
Sweets	Non-perishable	34	25	50	24	11
Miscellaneous	Perishable	16	78	44	52	66
	Non-perishable	108	64	89	121	61
Foods of Little Nutritional Value		83	68	52	64	59
Country food		25	20	33	32	31
Total (all sources)		382	404	479	471	402

* Excluding dairy products contained in macaroni and cheese dinner, pizza and other miscellaneous combination foods

Iron

Country food was the major source of iron in both communities in 1997, providing almost two thirds of total iron intake in Pond Inlet and 41% in Repulse Bay. Country foods were a less important source of iron to the diet of women in Repulse Bay than in 1992, when they provided two thirds of total iron intake. In 1997, store meats contributed only 7% of iron in Pond Inlet and 8% in Repulse Bay. Store foods provided similar amounts of iron in both communities in both years – an average of 8 to 9 mg per day. The main sources from store foods were non-perishable Cereal Products, Miscellaneous non-perishable foods such as macaroni and cheese dinner, and perishable Meat, Poultry and Fish (Table 60).

Table 60. Mean iron intake (mg per day) from major sources

Food group/Food Mail category		Repulse Bay		Pond Inlet		
		1992	1997	1992	1993	1997
Eggs	Perishable	0.1	0.2	0.2	0.1	0.1
Meat, Poultry, Fish	Nutritious Perishable	1.0	0.7	1.1	0.5	0.8
	Convenience Perishable	0.1	0.3	0.4	0.2	0.6
	Non-perishable	-	0.1	-	0.2	0.2
	Country	15.7	5.2	19.2	18.7	14.3
Cereal Products	Perishable	0.5	0.4	0.7	0.4	0.7
	Non-perishable	2.1	1.8	2.3	3.6	1.5
Fruits, vegetables	Perishable	0.3	0.3	0.5	0.3	0.7
	Non-perishable	0.1	0.2	0.2	0.2	0.2
Miscellaneous	Nutritious Perishable	0.2	0.8	0.4	0.6	0.7
	Convenience Perishable	-	0.1	-	0.1	-
	Non-perishable	1.9	1.3	1.4	1.6	1.2
Foods of Little Nutritional Value		1.4	1.3	0.9	1.3	1.1
Total (all sources)		23.6	12.9	27.7	28.1	22.3

Note: "-" indicates a mean intake of less than 0.05 milligrams

DISCUSSION AND CONCLUSIONS

Impact of the Food Mail Program on Food Security

Changes made to the Food Mail Program have significantly reduced the cost of nutritious perishable food in both communities since 1992, especially in Pond Inlet. However, higher prices for non-perishable foods have led to a small increase in the total cost of a nutritious food basket. In 1997, the purchase of the Northern Food Basket still required 96% of after-shelter social assistance income in Repulse Bay and 94% in Pond Inlet. This left almost nothing for other expenses such as clothing, cigarettes, paper products, cleaning supplies and transportation. While food security had improved slightly in both communities since 1992, food security remained an issue of serious concern for many families, especially for those on social assistance and the working poor. Furthermore, half of families in Repulse Bay and almost 40% of those in Pond Inlet who had an opinion on food affordability felt they were less able to afford to feed their family than they were five years ago, far exceeding the number who were finding it easier. Increases in the cost of rent, non-perishable foods, non-food items, foods of little nutritional value and fried chicken may have made food less affordable for many families in these communities.

A lack of jobs in the community and not having enough money to buy food were the issues of greatest concern to most women in this survey. About 40% of women in both communities continue to be extremely concerned about not having enough money for food. Although families in Pond Inlet were less concerned about alcohol and drug abuse and family violence than in 1992, about 20% of women were still extremely concerned about this issue. Such high stress levels may be a factor in overeating, a high consumption of snack foods and low activity levels.

Health and Nutrition Concerns

A number of health and nutrition concerns continue to exist in these communities for women of childbearing age, especially for women who are pregnant or lactating, and many of the health concerns are nutrition-related. This study did not find a significant improvement in nutrient intake, with the exception of a higher intake of vitamin A in Repulse Bay.

Fat and saturated fat intakes continue to be above the recommended limit in both communities. Between 1992 and 1997, the percentage of energy from fat increased in

Repulse Bay from 28% to 35%, a level similar to that in Pond Inlet and among other Inuit populations in Canada. In view of the increase in obesity in both communities, these levels may be a health concern. However, it is difficult to apply current recommendations for the level of fat and the ratio of saturated to polyunsaturated fat to the Inuit diet, since country fats are quite variable in their ratio of saturated to polyunsaturated fats and the traditional Inuit diet of marine mammals is higher in omega-3 than omega-6 fatty acids – the reverse of that recommended in a southern Canadian diet.[55] For this study, it was not possible to analyse the omega-3 and omega-6 fatty acid intakes, and therefore to calculate their ratio. In addition to their obvious cultural benefits, country fats provide many health benefits, including the protective effect of omega-3 fatty acids against cardiovascular disease, fat-soluble vitamins A and E, and satiety.

Country fats have sustained the Inuit population for thousands of years. From the standpoint of health, the amount of energy supplied by country fats is more important than total fat intake. Country food supplied 34% of fat calories in Pond Inlet, compared to only 20% in Repulse Bay. Foods of Little Nutritional Value were the most important source of fat in Repulse Bay. If energy intake is higher than that needed to satisfy requirements, this excess energy is stored as fat. Overweight is a major factor in hypertension, diabetes, hypercholesterolemia and cardiovascular disease. However, efforts to reduce fat intake should focus on encouraging consumption of country food and reducing the consumption of market fats or store foods high in fat such as fried chicken and potato chips. A more active lifestyle would also help to maintain energy balance.

Pond Inlet women had a significantly higher intake of folate and fibre in both years and, in 1997, a higher intake of iron compared to women in Repulse Bay. However, mean intakes of calcium and folate were still much lower than recommended, especially for pregnant and lactating women, and especially in Repulse Bay. This low folate intake may contribute to folate-deficiency anaemia and low birthweight among the offspring of these women. Folate status may be lower than mean intakes would suggest, since smoking interferes with the absorption of folate and most women, including those who are pregnant and lactating, smoke. A low folate status would also increase the risk for cardiovascular disease.

Obesity has increased dramatically since 1992 in both communities. In 1997, 50% of women in Repulse Bay and 33% in Pond Inlet had a BMI over 27. This leads one to suspect that energy and fat intakes were under-reported in this study. Under-reporting of energy and fat was also suspected in the Quebec Inuit health survey and is consistent with the findings elsewhere in the literature, where socially unacceptable, high-fat snack foods, such as potato chips, are believed to be under-reported on the

24-hour recall. The high incidence of high birthweight (4000 grams or more) in Repulse Bay may signal an increase in the risk of non-insulin dependent diabetes among the women in this community and their offspring.

There has been a notable improvement in self-rated health status in Pond Inlet and a marked deterioration in Repulse Bay since 1992. Self-ratings were much higher in Pond Inlet than in Repulse Bay in 1997 – a reversal of the situation in 1992. Sixteen percent of women in both communities reported medical conditions other than food allergies and difficulty digesting milk. These included anaemia, heart disease, high blood pressure and diabetes – all of which are nutrition-related.

Changes in Food Consumption since 1992

It is important to bear in mind that these nutrition surveys could not have captured the full impact of changes to the Food Mail Program, since the first surveys took place in the spring of 1992 – seven to eight months after the postage rates fell from $2.10 to $1.50 per kilogram. No nutrition surveys were undertaken to provide baseline information for the period prior to the first rate reduction. Canada Post's data for 1991-92 suggest that the consumption of perishable food in Pond Inlet at that time was much lower than in 1992-93 (Table 4). However, since Repulse Bay was ineligible for Food Mail service until October 1991 and only one store had started to use the service in 1991-92, the information on shipments of perishable food to Repulse Bay in 1991-92 would not fully account for the consumption of these foods during this period.

Changes to the Food Mail Program were expected to improve nutritional status by making Nutritious Perishable Foods more affordable, thereby increasing their consumption. The food frequency questionnaire suggests an increase in the consumption of Nutritious Perishables, particularly fruits and vegetables in Pond Inlet, since 1992. The 24-hour recall found that women in both communities consumed more Miscellaneous perishable foods (mainly pizza) in 1997. However, there was no increase found in the consumption of Nutritious Perishables in total in Pond Inlet, and the 20% increase found in Repulse Bay was not statistically significant.

According to the 24-hour recall, women in Pond Inlet had a significantly higher consumption of perishable fruits and vegetables than women in Repulse Bay in both years. Canada Post data indicate shipments of Nutritious Perishable Food that are about 65% higher than the consumption indicated by the 24-hour recalls of Inuit women in both communities. There is a possibility that some foods that are ineligible or non-perishable have been accepted or reported as Nutritious Perishable Foods. However, it

is important to bear in mind that Canada Post's data represent weights "as shipped," whereas our survey measured weights "as consumed," i.e., less packaging, spoilage and loss in food preparation. Losses due to spoilage are generally much greater than in the south.

This study agreed with Canada Post's data regarding the difference between the two communities in the volume of shipments. According to Canada Post's data and the 24-hour recalls, both shipments and consumption of Nutritious Perishable Food were about 40% higher per capita in Pond Inlet than in Repulse Bay in 1997. However, the 24-hour recall data for 1992 and 1997 did not agree with the substantial increase in the shipment of these foods between 1992-93 and 1997-98 in both communities as reported by Canada Post (Table 4). The much smaller increases in consumption found in this study were not statistically significant (Table 50). This difference could be attributed to a number of factors. The surveys were undertaken during a two-week period in April/May 1992 and April/May/June 1997, which may not be the most typical times in terms of the shipment of these foods. More than one 24-hour recall spread out over a longer period would be necessary to overcome day-to-day and seasonal variations in food consumption. At the time of the 1992 survey only one of the two retailers in Repulse Bay was using the Food Mail Program. Therefore, Canada Post's shipments in 1992-93 would not have accounted for all of the Nutritious Perishable Food being consumed in this community at the time of the 1992 survey. The discrepancy may also mean that some other group, such as children, tourists or non-Inuit, are primarily responsible for the increase reported by Canada Post.

Also, in these communities, fresh fruits and vegetables arrive once a week and disappear within a few days, so that any disruption, such as poor weather or problems in transportation, can seriously interfere with the supply. During the Pond Inlet survey in 1997, the shipment of perishables to one of the local retailers arrived badly damaged, leaving much of the shipment unsaleable. This incident may have contributed to a lower than usual consumption of these foods.

The nutritional benefit from a higher consumption of Nutritious Perishable Foods would depend on which foods were consumed in greater quantity. Canada Post does not provide detailed data on the foods shipped. Therefore, it is impossible to determine from Canada Post's data which foods are responsible for the increase in reported shipments of perishables. This study found a higher consumption of frozen prepared foods such as pizza and a lower consumption of more traditional foods such as bannock. This change is consistent with a North American trend toward more frozen prepared foods, a trend influenced not only by availability but also by aggressive television advertising. Unfortunately, while pizza does provide calcium, folate and vitamin A, it is not the best source of these nutrients among Nutritious Perishable Foods

and it is also a source of fat and saturated fat. It was not the intent of the Food Mail Program that Nutritious Perishable Food would replace healthy non-perishable foods. Rather, it was expected that more affordable Nutritious Perishables would replace "junk foods."

The high consumption of Foods of Little Nutritional Value is clearly an important factor in the nutrition and health problems in both communities. The 24-hour recall found no change in the consumption of these foods since 1992, and, in Repulse Bay, these foods accounted for 23% of fat intake and 19% of saturated fat intake in 1997. Furthermore, the food frequency questionnaire suggests usual consumption of these foods may be higher than reported on the 24-hour recall. A high consumption of these foods, together with a trend toward more high-fat convenience foods such as pizza and a more sedentary lifestyle, may well explain the increasing incidence of obesity found in this study.

The 24-nour recall and the food frequency questionnaire provided contradictory results with respect to changes in the consumption of Convenience Perishable Foods. This issue requires further study in order to determine whether the removal of these foods from the Food Mail Program has had the intended effect of lowering their consumption.

We found some evidence that women of childbearing age were eating less country food in 1997 than in 1992. While this may have been a peculiarity of the survey periods, it may also reflect a real trend away from country food by individual women for various reasons, as well as a cohort effect, i.e., the replacement of women in the sample who were 40 to 44 years old in 1992 by girls aged 10 to 14 at that time who would have been 15 to 19 by 1997. Other studies have found a lower consumption of country food among younger women.[633] Our study was able to demonstrate a significantly lower consumption among women between 15 and 24 than among those 25 to 44. It is surprising to find such a marked difference between these two age groups. By 1997, women in the youngest age group in Repulse Bay were getting less than 100 Calories per day from country food – a level far lower than has been reported in Inuit nutrition surveys. If these findings represent a trend among young women, this would be disturbing, since such a change has the potential of increasing the risk for iron-deficiency anaemia. It would also reduce the intake of omega-3 fatty acids, vitamin A and vitamin E which are protective against cardiovascular disease and lead to a higher intake of saturated fat, jeopardizing the health and nutritional status of women of childbearing age.

Further analysis would be required to determine if the difference in country food consumption by age also existed in 1992 and to identify the substitutions being made by younger women. Such information would enable educators to target these foods in

their nutrition education efforts and assist policymakers in future decisions related to the Food Mail Program. While it is possible that Inuit women in their late teens and early twenties who are now eating very little country food will increase their country food consumption when they get older, it is also possible that they will not do so to the same extent as the previous generation.

It is not clear why Pond Inlet continues to have a higher consumption of country food than Repulse Bay since access is not a problem and safety not an issue of concern for most women in either community. There are other differences in country food consumption between the two communities which contribute to differences in nutrient intake, namely a higher consumption of seal meat and muktuk in Pond Inlet.

Factors Affecting Food Choices

Changes to the Food Mail Program appear to have created a greater demand for some Nutritious Perishable Foods, but not always for the most nutritious choices. There is some evidence that food consumption patterns have changed in response to availability, but food preferences are the result of a complex interplay of social and cultural pressures and personal, family and community values. Nutritional knowledge, marketing, food quality, lifestyle, education, income, self-image and television advertising help to shape these choices. Frozen prepared foods are heavily advertised, fit well into the Inuit tradition of foods requiring little or no preparation and, from a retailing perspective, are less susceptible to spoilage than fresh or frozen produce. Other obstacles to a higher consumption of certain foods may play a role. For example, lactose intolerance is known to be a problem for this population, a fact which may bring into question the benefit of promoting certain dairy products. Furthermore, food affordability is affected by income and the cost of other goods and services.

In Pond Inlet, consumption of perishable fruit and vegetables was highest among those who were relatively well-off. The price reduction achieved to date has not been sufficient to persuade families on social assistance or the working poor to purchase perishable fruit and vegetables to the same extent as the relatively well-off. It may be that these foods are perceived by low-income families as a luxury food, affordable only by those in the higher income bracket. On the other hand, all socio-economic groups reported eating the same amounts of LNV foods. Inuit women may be willing to purchase fruits and vegetables only if they can afford to do so after buying the desired amounts of LNV foods.

Changes to the Food Mail Program appear to have been more successful in improving the quality and variety of fresh fruits and vegetables and in reducing their cost in Pond Inlet than in Repulse Bay. This difference has undoubtedly resulted in a higher consumption of these foods in Pond Inlet, especially among the higher income group. Even though consumption of fruits and vegetables in Pond Inlet is still low by southern standards, this difference is responsible for a significantly higher intake of folate and fibre than in Repulse Bay and may have been a factor in the improvement in self-rated health status of Pond Inlet women.

We were able to find more relationships between socio-demographic variables and nutrient intakes and food choices in Pond Inlet than in Repulse Bay. In Pond Inlet, soico-economic status was found to be related to the consumption of perishable fruits and vegetables, folate intakes from these foods, and total vitamin A intake. Age was found to be a factor in the consumption of LNV foods in Pond Inlet and in the consumption of country food in both communities. However, these relationships were not found in Repulse Bay, except between age and country food consumption. It may be that such relationships do not exist in Repulse Bay, that the sample size is too small, or that women in Repulse Bay had greater difficulty responding to the questionnaire.

Price may be a factor in the consumption of perishable fruits and vegetables and dairy products, but making the most nutritious food choices among market foods requires a certain level of knowledge regarding their price, preparation and nutritional benefits. In these communities, shoppers would often have difficulty in determining the price of perishable fruits and vegetables, since prices are not consistently presented, nor are the foods that are eligible for the Food Mail Program identified in the store. Furthermore, these foods must be of an acceptable quality if people are to be persuaded to increase their consumption of these foods and if the foods are to retain their nutritional benefit. Unfortunately, this cost reduction for some of the more nutritious foods such as fruits and vegetables has not occurred to the same extent in all communities, and therefore these foods are not equally accessible. If some of these foods are still unaffordable, nutrition education about market foods would be of little use. Higher prices for fresh and frozen fruits and vegetables and poor quality and variety in Repulse Bay may reflect problems with the transportation or retail storage of these foods in this community. Improving the handling of these foods would remove one obstacle to higher consumption.

To see an improvement in nutrition and health, Inuit women would have to reduce their consumption of "junk food" and increase their consumption of country food, including organ meats and fats, and/or fruit, vegetables and dairy products. Returning to a traditional diet may be the ideal solution, but for many, this may not be practical or desirable.

Ways of Improving the Effectiveness of the Food Mail Program

These somewhat disappointing results lead one to question whether the funding is being applied in the most effective manner, particularly if the current structure is encouraging the consumption of prepared frozen foods. Perhaps the program should focus on fruit, vegetables and dairy products and provide a lower postage rate for these foods rather than the current uniform rate for all Nutritious Perishable Foods.

For some, removal of all frozen prepared foods, such as pizza, from the program would be an obvious step. But such a move may not necessarily result in any improvement in nutritional status, since the change in nutrient intake would depend on the substitutions made. If the removal of these foods motivated people to purchase more perishable fruits and vegetables and dairy products or to eat more country food, this would be beneficial. However, if people continued to purchase these foods, regardless of price, or substituted foods of little nutritional value, this would lead to a higher intake of fat, saturated fat and sugar and a lower intake of calcium, vitamin A and folate. Such a change may increase the risk of obesity, diabetes and cardiovascular disease.

Although we did not find any relationship between nutrient intake and nutrition training taken during the past five years, this does not necessarily mean that the nutrition education programs were ineffective. We have no information on the nature of the training or on the nutrient intake of the participants prior to this training. The nutrition training may well have been an underlying factor in the decision of some women to eat better, which, for many, means eating more country food. However, less than a quarter of the women in Repulse Bay and just over a third in Pond Inlet said they had made major changes in their food habits over the past five years, and despite the high consumption of junk foods and prevalence of obesity, very few women said they were eating less of these foods.

If the postage rate for Nutritious Perishables had not been reduced, or if the program had been phased out as announced in 1989, the food security and nutrition situation in these communities would very likely have deteriorated, since the cost of Non-perishables has continued to increase over this period and the cost of Nutritious Perishables would also have increased. Changes to the Food Mail Program have not on their own resulted in a substantial improvement in food affordability, nor do they appear to have had a significant effect on nutrient intakes. However, this may be partly due to factors beyond DIAND's control. The amount of subsidy may not be sufficient to generate nutritionally significant changes, especially without a complementary nutrition education program and other complementary initiatives.

There are many initiatives which could be taken by various groups at the local, regional or federal level that would help to support this program and improve nutrition. Schools, health centres, social service agencies and retailers all have a role in nutrition education. If a concerted effort is not made to address the need for intensive nutrition education programs, the Food Mail Program can only hope to have limited success. Local hamlet councils could insist that retailers post prices, improve their storage, handling and marketing of nutritious perishable foods and reduce their marketing of "junk foods." By posting the price of perishable fruits and vegetables and dairy products and indicating which foods are supported by this subsidy, retailers could play a major role in creating a better understanding of this program and its objectives. Regional and national Inuit organizations could also have a major impact on nutrition and health by seeking additional funding from the territorial and federal governments and industry, both for the subsidy and for nutrition education, and by insisting on better handling of these foods by the Inuit-owned and other airlines and by retailers. These organizations could also work with parents and community leaders to promote more nutritious food choices.

The Food Mail Program may have raised unrealistic expectations if the changes made since 1992 were expected to achieve a major change in food costs and nutrition on their own. However, if the program is perceived to have failed or to be of no value, this will only add to the sense of frustration and helplessness of people living in isolated communities. Our study found serious health and nutrition concerns and these must be addressed or health care costs will continue to escalate. Price is a determining factor in food choice, and therefore, if the Food Mail Program can make the most nutritious perishable foods affordable and acceptable in terms of quality, it can play an important role in improving nutritional status. However, significant improvement in nutritional status will require the joint effort of Aboriginal organizations, all levels of government and industry.

Lessons Learned

This study found a number of differences between the two communities, in terms of income, education, food security, health status and food consumption patterns. Therefore, one cannot reasonably generalize these findings to other Inuit communities or to the First Nation communities that use this program. These findings do, however, provide a scientific basis for action.

It is important that studies such as this do not add to the sense of helplessness and frustration experienced by families living in these communities by pointing out problems

and comparing communities in their nutrition and health status. Given the serious nutrition and health concerns raised in this study, the only ethical rationale for undertaking such research must be to improve the health and nutrition of this population. Surely, this is the expectation of those who participate at the community level. Such research cannot be justified merely as a monitoring exercise. If no action – or inappropriate action – is taken based on the results of these surveys or on a misunderstanding of the results, DIAND's credibility in managing food security issues throughout the North could be seriously compromised.

This survey is the first attempt to compare nutrient intakes and food consumption patterns among two Inuit populations over time using two instruments for measuring dietary change. Through this exercise, we discovered a number of errors and inconsistencies in the earlier data which have been corrected. Because we were trying to measure change with two dietary instruments, we became more aware of some of the difficulties inherent in the structure of the food frequency questionnaire for this population group, which would not have been as obvious from a single survey. We should endeavour to use the experience gained through this exercise to improve the quality of the instruments in order to gain a more accurate and reliable picture of dietary change within this population.

We have tried to look at change by comparing data from 24-hour recalls and food frequency questionnaires in 1992 and 1997, together with women's perceptions of change in food consumption over this period and Canada Post data on shipments. The results were inconsistent in several respects. It is understandable that perceptions of change may be inconsistent with behavioural change. Most researchers would also admit the difficulties associated with comparing the 24-hour recall and food frequency questionnaire, since each instrument has its limitations. Although one might have expected both instruments to agree on the direction of change, one must also acknowledge the complexity of the task of measuring dietary change in such an unpredictable environment, where weather and food supplies vary widely from week to week. In this environment, the 24-hour recall data would be more sensitive to disruptions in the food supply than the food frequency data. Nevertheless, in Pond Inlet, analysis of the 1997 food frequency data supported most of our findings from the 24-hour recall regarding differences in the consumption of food groups or Food Mail categories by socio-economic status, education and age.

Given the results of this survey, we cannot say with certainty whether food consumption patterns or nutrient intakes have changed in these two communities in response to changes in the Food Mail Program. If Canada Post's data on shipments are accurate, it is possible that nutrient intakes have improved more than we have been able to demonstrate. However, we cannot assume that the increase in shipments recorded by

Canada Post accurately reflects an increase in consumption, or that the periods selected for the survey should produce results that are compatible with Canada Post's data for the two fiscal years concerned.

The apparent contradiction between our findings regarding change in the consumption of Nutritious Perishable Foods and the evidence from Canada Post data raises the issue of whether retail sales records would provide a better measure of change than dietary surveys. If the sales data could be provided with sufficient detail, this would be very helpful information. However, such data would overestimate actual consumption, and could not be used to assess the nutrient intake or food security of this population or to ascertain which groups may be benefiting.

Suggestions for Further Analysis and Action

This study points to a number of areas warranting further analysis and action:

1. Investigation into the reason for the higher cost and lower quality of perishable fruits and vegetables in Repulse Bay compared to Pond Inlet and ways of improving this situation.

2. Development of measures to ensure that the savings are being passed on for fruits, vegetables and dairy products in all isolated communities.

3. Consideration of a more highly focussed approach that would provide a lower postage rate for perishable fruits and vegetables and dairy products and an assessment of the impact of such a change on food costs and nutrient intake.

4. Assessment of the impact of the program on nutrition in other communities.

5. Joint initiatives with federal, territorial and provincial governments as well as industry to support the program through culturally appropriate, practical and effective long-term nutrition education programs integrated into a program for healthy living.

6. Examination of the barriers to country food consumption among younger women and ways of increasing the consumption of country food among young women of childbearing age.

7. Examination of the extent of iron and folate deficiency among Inuit women of childbearing age and ways of alleviating this problem.

8. Development of better measures of food security.

9. Investigation into the relationship between age and country food consumption in these two communities in 1992 and 1993.

10. Investigation into the relationship between age and the consumption of other foods (e.g., fruit and vegetables, dairy products, pizza, Convenience Perishables) in 1992, 1993 and 1997.

11. Investigation of changes in nutrient intakes (particularly energy and folate) and food consumption (particularly Nutritious Perishables) by socio-economic status between 1992 and 1997.

12. Examination of nutrient intakes and food consumption of those women who were extremely concerned about not having enough money to buy food.

13. Corrections to the data for the other communities surveyed in 1992 and 1993.

14. Improvements to the Hunter Support Program in order to increase the consumption of country food and nutrient intake among women of child-bearing age.

15. Development of culturally appropriate point-of-purchase and television advertising to promote healthy store foods as part of a healthy lifestyle.

16. Refinement of the food frequency questionnaire to improve its usefulness for this population.

17. Analysis of the reasons why Inuit women, particularly in Repulse Bay, are not eating fruits and vegetables and how these barriers could be overcome.

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APPENDIX A

Northern Air Stage Program: Eligible and ineligible products, May 1996

Nutritious Perishable Food

The following products are eligible for shipment at the postage rate applicable to Nutritious Perishable Food:

- dairy products (e.g., milk, buttermilk, cheese, processed cheese, processed cheese spreads, cottage cheese, butter, cream, ice cream, ice milk, sherbet, yogurt, frozen yogurt, yogurt drinks, powdered milk, chocolate milk), excluding canned milk
- margarine
- meat, fish and poultry products (fresh or frozen, including cured and smoked products, fish sticks and fish cakes)
- fruits and vegetables (fresh or frozen)
- fresh juice (pure or reconstituted) and frozen juice concentrate
- bread and bread products without sweetened filling or coating (e.g., bagels, English muffins, croissants, bread rolls, raisin bread, garlic bread, hamburger buns, hot dog buns, pizza crusts, frozen bread dough, tortillas)
- pizza
- eggs and egg substitutes
- selected semi-perishable food products (unsweetened seeds and nuts, cook-type cereals, whole wheat and rye flour, peanut butter, salad dressing, mayonnaise, yeast)
- tofu, vegetable patties, similar vegetable-based meat substitutes, soybean-based milk substitutes
- infant formula, infant cereals, other foods prepared specifically for infants
- non-carbonated water
- combinations of the above products (excluding sandwiches and other prepared foods for immediate consumption which are subject to the Goods and Services Tax)
- medicine

with the exception of products identified on the following page as Convenience Perishable Foods, which will no longer be eligible for shipment after August 1, 1996.

Convenience Perishable Foods

Effective August 1, 1996, the Northern Air Stage Program will not apply to the following Convenience Perishable Foods:

- fresh or frozen products consisting of meat, poultry, fish, vegetables or eggs which are breaded or battered or in pastry
- combinations containing any of the products described above

with the exception of fish sticks, fish cakes, and reduced-fat products, of the type described above, which have been specifically approved as eligible for the Northern Air Stage Program by the Department of Indian Affairs and Northern Development.

The following are **examples** of Convenience Perishable Foods which will not be eligible after August 1, 1996: fried chicken, sausage rolls, fish in batter, fish and chips, chicken and chips, breaded onion rings, meat pies, quiche, frozen dinners which contain breaded chicken.

Non-perishable Food

The following products are among those which are eligible for shipment at the postage rates applicable to non-perishable food. The list is not intended to be comprehensive, but confirms the eligibility of certain items.

- canned products such as milk, juice, fruit, vegetables, soup, meat, fish and poultry
- dry beans, peas and lentils, popping corn (unpopped)
- dried fruit and vegetables, dried soup mixes
- crackers, crispbread, hard bread, Pilot biscuits, melba toast
- arrowroot and social tea cookies
- all purpose flour, cake and pastry flour
- rice, other grains
- pasta (macaroni, spaghetti, noodles, macaroni and cheese dinners)
- ready-to-eat breakfast cereals
- cake mixes, pancake mixes, muffin mixes, bread and roll mixes, bannock mixes, pizza mixes, jelly powders, pudding mixes, puddings (canned or ready-to-eat)
- lard, shortening, cooking oils
- sugar, salt, baking powder, cornstarch
- spreads, syrups, sauces, condiments, toppings (excluding artificial cream products)
- coffee, tea
- fruit-flavoured drinks with at least 25 percent natural juice (fresh, canned, boxed, or frozen)
- fruit-flavoured drinks with vitamin C added (fresh, canned, boxed, or frozen)
- fruit drink crystals with vitamin C added

Foods of Little Nutritional Value

The Northern Air Stage Program does not apply to the following food and beverage products:

- beer, wine and spirits
- soft drinks
- carbonated mineral water
- fruit-flavoured drinks with less than 25 percent natural fruit juice or without vitamin C added*
- fruit drink crystals without vitamin C added*
- sweets and snack foods:
  - candies, confectionery, chewing gum, licorice, chocolate bars, granola bars
  - fruit, seeds and nuts when coated or treated with candy, chocolate, honey, molasses, sugar, syrup or artificial sweeteners
  - fruit bars, rolls, or similar fruit-based snack foods
  - potato chips, corn chips, tortilla chips, pretzels, popped corn products, cheese puffs, and similar products
  - snack mixtures (e.g., "nuts 'n bolts")
- sweetened baked goods (cakes, muffins, pies, pastries, tarts, cookies, doughnuts, brownies, croissants with sweetened fillings or coatings, waffles and similar products), excluding arrowroot and social tea cookies*
- pie shells and other frozen pastry products
- prepared foods for immediate consumption (e.g., sandwiches, prepared salads, hamburgers, hot dogs)
- frozen flavoured ice (e.g., Popsicles)
- imitation cream products (e.g., non-dairy coffee whiteners, non-dairy whipped dessert toppings)
- meal replacements for weight reduction

* Note: Fruit-flavoured drinks with vitamin C added or with at least 25 percent natural fruit juice, fruit drink crystals with vitamin C added, and arrowroot and social tea cookies are accepted at the rates for non-perishable food.

Non-food Items

All non-food items, with the exception of tobacco, dangerous goods and other prohibited mail as defined in the *Canada Postal Guide*, are eligible for shipment at the rates applicable to non-food items. **Effective August 1, 1996**, the following additional items will not be eligible for the Northern Air Stage Program:

Recreation equipment and supplies* including
- sporting and athletic goods
- fitness equipment
- bicycles and tricycles
- toys, games, puzzles, models and hobby supplies
- playground equipment
- photographic equipment and supplies
- musical equipment
- computer equipment (hardware and software)

Entertainment equipment and supplies including
- radios, audio and video components or combinations
- audio and video tapes, either blank or pre-recorded
- televisions
- other electronic equipment
- compact discs and records

Reading material including newspapers, magazines, books and other printed matter (newspapers, magazines and books qualify for mailing under Canada Post's Publications Mail Postage Rates and Library Mail Rates)

All paper products **with the exception** of:
- disposable diapers
- disposable undergarments
- feminine hygiene products
- nursing pads
- toilet paper

Animal food and other animal supplies.

* Note: Camping equipment, snowmobile parts, all-terrain vehicle parts, outboard motor parts, snowshoes, binoculars and other equipment used for hunting, fishing and trapping will remain eligible, even if intended for recreational use.

APPENDIX B

Classification of foods reported in the 24-hour recall according to food groups and Food Mail categories

Classification of foods reported in the 24-hour recall according to food groups and Food Mail categories

Food groups	Nutritious Perishable Foods	Non-perishable Foods	Foods of Little Nutritional Value	Country Foods	Convenience Perishable Foods
Dairy Products	Cheese, natural (cheddar, mozzarella, Parmesan) Processed cheese slices Processed cheese spread Cottage cheese Cream cheese dip Fluid milk (including chocolate) Ice cream/ice cream bars/ ice cream sandwiches Milk shakes Powdered skim/whole milk Yogurt and yogurt beverages	Evaporated milk			
Eggs	Eggs				
Meat, Poultry, and Fish	Fresh and frozen meat, poultry, fish (excluding Convenience Perishable Foods) Luncheon meat (e.g., bologna, salami, pastrami) Frozen fish sticks Frozen beef patties Wieners	Canned meat, poultry, fish, and luncheon meat		Country meat, birds, fish (fresh/aged/ dried) Caribou bone marrow Muktuk Liver	Frozen fried breaded chicken Frozen fish in batter
Meat Alternates	Bacon bits, meatless Nuts Peanut butter Seeds				

Food groups	Nutritious Perishable Foods	Non-perishable Foods	Foods of Little Nutritional Value	Country Foods	Convenience Perishable Foods
Cereal Products	Breads, plain/whole grain Cook-type breakfast cereals (e.g., rolled oats) Rolls, plain English muffins Rice, fried, frozen	Bread and roll mix Bread stuffing mix Cake, cookie, muffin, pancake mixes Cereals, ready-to-eat Cookies, plain (arrowroot, social tea) Cornstarch Crackers Pilot biscuits Flour Ice cream cones (cone only) Pasta, dry (macaroni, spaghetti, noodles) Rice pilaf mix, dry Rice, white, with pasta and seasonings Rice, white, long-grain, regular and instant	Cookies, sweet (e.g., chocolate chip, oatmeal, marshmallow) Danish pastry/ turnovers/Pop Tarts Doughnuts Cakes, frozen/fresh Waffles, frozen Granola bars Pies/tarts Banana bread Muffins		
Citrus and Tomatoes	Fruit juice (apple with vitamin C, orange), fresh or frozen Citrus fruit (oranges, grapefruit, lemons) Tomatoes	Fruit juice (apple with vitamin C, orange), canned or bottled Spaghetti sauce (tomato), canned Tomato juice, canned Tomato paste/sauce, canned Tomatoes, canned			
Other Fruit	Fruit, fresh or frozen Fruit juice, frozen, no vitamin C (e.g., grape)	Fruit, canned Fruit, dried Fruit juice, canned, no vitamin C (e.g., grape)			
Potatoes	Potatoes, fresh Potatoes, French-fried/ hash brown, frozen	Potatoes, canned Potatoes, instant mashed flakes, dry	Potato chips		

Food groups	Nutritious Perishable Foods	Non-perishable Foods	Foods of Little Nutritional Value	Country Foods	Convenience Perishable Foods
Other Vegetables	Vegetables, fresh or frozen	Vegetables, canned Vegetables, dehydrated (onion flakes)			
Fats and Oils	Butter Margarine, tub Salad dressing	Lard Shortening Vegetable oil (e.g., canola, corn, soybean, olive)		Country fat	
Sugar and Sweets		Baking chocolate Chocolate-flavoured beverage mix (Quik) Cocoa powder Dessert topping, powdered Equal (low-calorie sweetener) Fruit drink crystals with Vitamin C added Fruit drinks (with vitamin C or 25% juice), canned, bottled, frozen Gelatin dessert powder Jams and preserves Molasses Pudding mixes Sauces, sundae Sugar/syrups	Candy Chewing gum Chocolate bars Coffee whitener (non-dairy), powdered/frozen Fruit drink crystals, without vitamin C Instant tea, frozen Popcorn, caramel-coated Fruit-flavoured ices (e.g., Popsicles/ Slush Puppies) Frozen cheesecake Soft drinks		

Food groups	Nutritious Perishable Foods	Non-perishable Foods	Foods of Little Nutritional Value	Country Foods	Convenience Perishable Foods
Miscell-aneous	Frozen sweet and sour pork Pizza/Pizza Pops Rice fried with meat, frozen TV Dinners (e.g., Salisbury steak, turkey, roast chicken)	Baking powder/soda Breading for baked or fried chicken Canned beef/chicken stew Canned meatballs Chow mein, canned Coffee, regular/decaffeinated Corned beef hash, canned Dried herbs and spices Gravies Macaroni and cheese dinner (e.g., Kraft Dinner) Pickles and olives Pasta with sauce, canned Sauces (e.g., ketchup, Worcestershire, soy, barbecue, sweet and sour) Sauces, dehydrated Soups, canned Soups, dehydrated Spaghetti sauce (with meat) Tea, regular/instant/herb Dried fruit and nut mix Vinegar Water Yeast, Baker's, dry	Cheese straws Popcorn, popped with salt Sandwiches and burgers, ready-to-eat Tortilla chips		Breaded fried onion rings, frozen Corn dogs, frozen Fish and chips, frozen Fried chicken dinners, frozen Pies (meat, chicken/ turkey), frozen
Alcohol			Liquor (rum, vodka)		

APPENDIX C

Energy and nutrient intakes by Food Mail category

Table C-1. Mean energy and nutrient intakes by Food Mail category, Repulse Bay

Food Mail category	Calories	Protein	Carbo-hydrate	Fat	Saturated fat	PUFA	Chol-esterol	Fibre	Calcium	Iron	Magnes-lum	Phos-phorus
		g	g	g	g	g	mg	g	mg	mg	mg	mg
1992												
Nutritious Perishable	355	20	26	19	7.3	2.5	75	1.7	100	2.1	43	236
Convenience Perishable	20	2	1	1	0.4	0.2	5	0.0	2	0.1	2	12
Non-perishable	819	16	151	17	6.2	2.4	34	2.9	173	4.3	115	230
LNV	426	6	69	15	6.5	2.0	13	1.0	83	1.4	25	168
Country	352	63	0	9	2.2	1.3	163	0.0	25	15.7	56	502
Total	1972	106	246	61	22.6	8.3	291	5.6	382	23.6	240	1148
1997												
Nutritious Perishable	426	24	34	21	8.5	2.5	123	2.0	177	2.4	43	302
Convenience Perishable	77	7	2	4	1.2	0.9	21	0.1	6	0.4	7	50
Non-perishable	491	12	84	12	4.3	1.8	21	2.4	133	3.5	60	212
LNV	439	5	70	15	3.7	3.4	13	1.5	68	1.3	32	159
Country	264	35	0	13	2.0	1.2	112	0.0	20	5.3	28	317
Total	1696	83	190	66	19.8	9.8	291	6.0	404	12.9	170	1041

Table C-1. Mean energy and nutrient intakes by Food Mail category, Repulse Bay (continued)

Food Mail category	Potassium	Sodium	Zinc	Vit A	Vit C	Thiamin	Riboflavin	Niacin	Vit B6	Folate	Vit B12	Caffeine
	mg	mg	mg	RE	mg	mg	mg	NE	mg	mcg	mcg	mg
1992												
Nutritious Perishable	420	379	2.9	121	8	0.23	0.30	8.0	0.32	27	1.1	0
Convenience Perishable	17	24	0.2	11	0	0.01	0.02	0.5	0.02	1	0.0	0
Non-perishable	1011	1452	1.9	48	32	0.43	0.43	9.6	0.18	37	0.3	751
LNV	294	366	1.0	14	6	0.10	0.12	2.6	0.08	15	0.3	18
Country	283	121	10.3	15	6	0.45	1.24	22.5	0.43	10	9.2	0
Total	2025	2341	16.3	208	51	1.21	2.09	43.1	1.02	90	10.9	769
1997												
Nutritious Perishable	479	620	2.7	206	10	0.30	0.41	9.9	0.37	39	1.1	0
Convenience Perishable	66	116	0.5	21	0	0.03	0.05	2.2	0.10	2	0.1	0
Non-perishable	570	904	1.5	91	46	0.34	0.33	7.0	0.18	33	0.4	221
LNV	453	377	0.9	17	16	0.10	0.09	3.0	0.12	20	0.2	21
Country	384	75	4.3	106	1	0.38	0.83	16.2	0.42	9	8.6	0
Total	1952	2093	9.8	441	74	1.15	1.71	38.3	1.19	104	10.3	242

Table C-2. Mean energy and nutrient intakes by Food Mail category, Pond Inlet

Food Mail category	Calories	Protein	Carbo-hydrate	Fat	Saturated fat	PUFA	Chol-esterol	Fibre	Calcium	Iron	Magnes-ium	Phos-phorus
		g	g	g	g	g	mg	g	mg	mg	mg	mg
1992												
Nutritious Perishable	505	28	43	24	9.5	2.7	127	3.2	185	3.0	54	330
Convenience Perishable	86	9	2	5	1.5	0.9	28	0.1	7	0.5	8	63
Non-perishable	649	14	114	16	5.6	2.4	22	3.0	201	4.1	77	228
LNV	353	3	62	11	3.5	2.7	6	1.0	52	0.9	23	107
Country	588	80	0	27	5.4	1.9	235	0.0	33	19.2	61	657
Total	2180	134	221	83	25.5	10.7	418	7.3	479	27.7	224	1385
1993												
Nutritious Perishable	326	17	30	16	6.5	1.7	74	2.0	163	1.9	36	234
Convenience Perishable	71	6	3	4	1.1	0.8	19	0.2	7	0.4	7	50
Non-perishable	865	18	150	22	6.6	3.9	25	4.3	206	5.9	96	278
LNV	451	4	78	14	3.9	3.8	12	1.4	64	1.3	30	145
Country	411	61	0	17	3.5	1.3	179	0.0	32	18.7	54	523
Total	2125	106	261	72	21.6	11.6	310	7.9	471	28.1	223	1231
1997												
Nutritious Perishable	523	25	50	25	10.0	2.8	94	3.7	197	3.1	56	329
Convenience Perishable	139	12	4	8	2.4	1.7	38	0.2	11	0.7	12	91
Non-perishable	449	12	78	10	3.3	1.9	18	2.3	106	3.2	62	164
LNV	391	4	67	11	4.0	2.3	14	1.0	59	1.1	23	122
Country	534	65	0	28	5.9	2.2	192	0.0	31	14.4	48	565
Total	2037	118	199	83	25.5	10.8	356	7.2	402	22.3	202	1271

Table C-2. Mean energy and nutrient intakes by Food Mail category, Pond Inlet (continued)

Food Mail category	Potassium mg	Sodium mg	Zinc mg	Vit A RE	Vit C mg	Thiamin mg	Riboflavin mg	Niacin NE	Vit B6 mg	Folate mcg	Vit B12 mcg	Caffeine mg
1992												
Nutritious Perishable	672	488	3.8	273	26	0.41	0.47	11.2	0.46	55	1.3	0
Convenience Perishable	77	128	0.7	8	0	0.03	0.06	2.6	0.12	2	0.1	0
Non-perishable	742	1568	1.9	144	48	0.39	0.48	7.4	0.20	46	0.4	307
LNV	255	198	0.5	11	7	0.05	0.06	1.2	0.09	12	0.0	17
Country	352	140	10.0	261	4	0.57	1.42	28.3	0.54	11	12.7	0
Total	2098	2522	16.9	697	85	1.45	2.48	50.8	1.40	127	14.5	325
1993												
Nutritious Perishable	417	424	2.2	158	15	0.20	0.32	6.4	0.27	35	0.8	0
Convenience Perishable	72	121	0.4	9	0	0.03	0.04	2.2	0.10	2	0.1	0
Non-perishable	871	1315	3.3	84	31	0.60	0.57	9.4	0.19	68	0.6	394
LNV	369	314	0.7	20	11	0.07	0.09	2.2	0.13	21	0.1	22
Country	398	144	8.5	233	2	0.51	1.42	23.8	0.52	9	11.2	0
Total	2128	2318	15.1	504	59	1.42	2.43	44.0	1.22	135	12.8	416
1997												
Nutritious Perishable	678	678	3.3	280	30	0.37	0.44	10.1	0.42	61	1.2	0
Convenience Perishable	123	201	0.8	16	0	0.04	0.08	3.8	0.18	3	0.2	0
Non-perishable	599	1174	2.5	105	23	0.31	0.31	6.4	0.20	35	0.5	252
LNV	248	244	0.6	15	7	0.09	0.08	1.6	0.09	13	0.1	29
Country	394	136	7.2	242	3	0.51	1.24	25.6	0.52	11	10.9	0
Total	2042	2432	14.4	659	63	1.31	2.14	47.4	1.42	123	12.9	281